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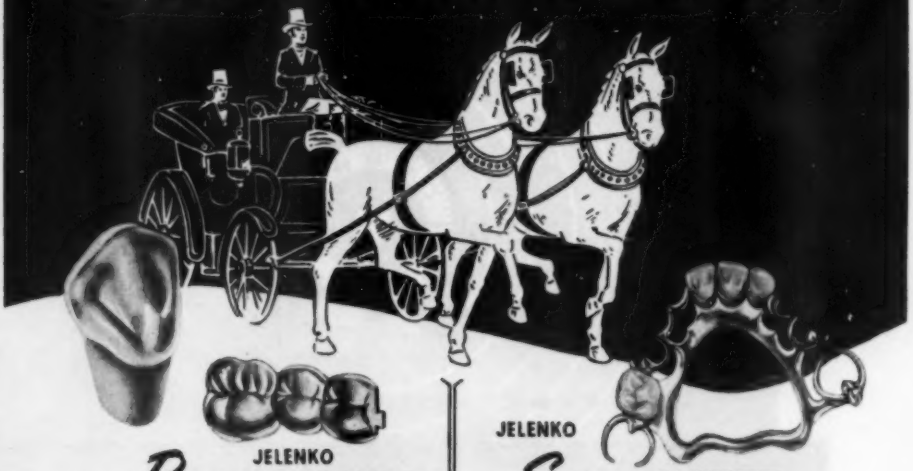

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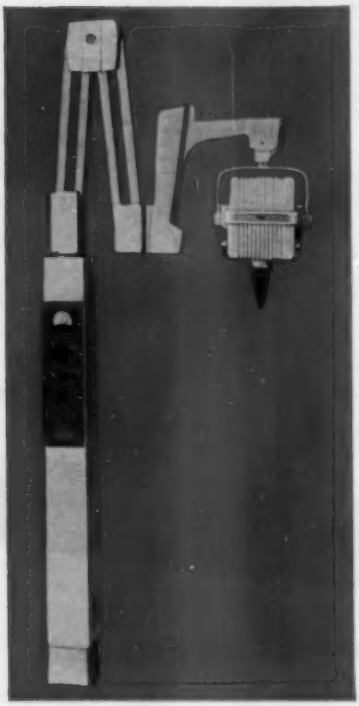

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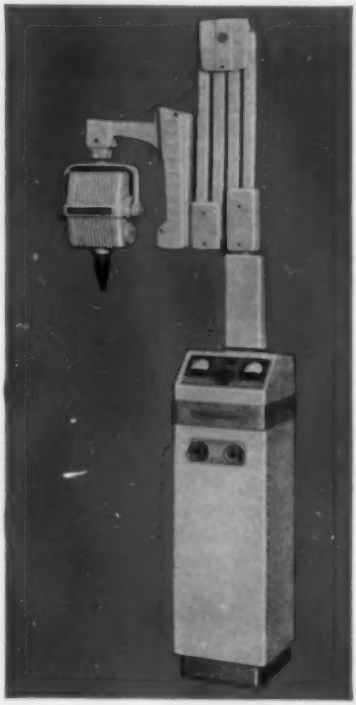

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1. Winter, L., Jr., and Van Gaasbeek, B.: New York State Dent. J. 18:119 (March) 1952.
2. Pollock, S. L., and Archer, W. H.: Pennsylvania Dent. J. 20:10 (March) 1953.
3. Kurzrock, A. H.: J. New Jersey Dent. Soc. 24:49 (April) 1953.

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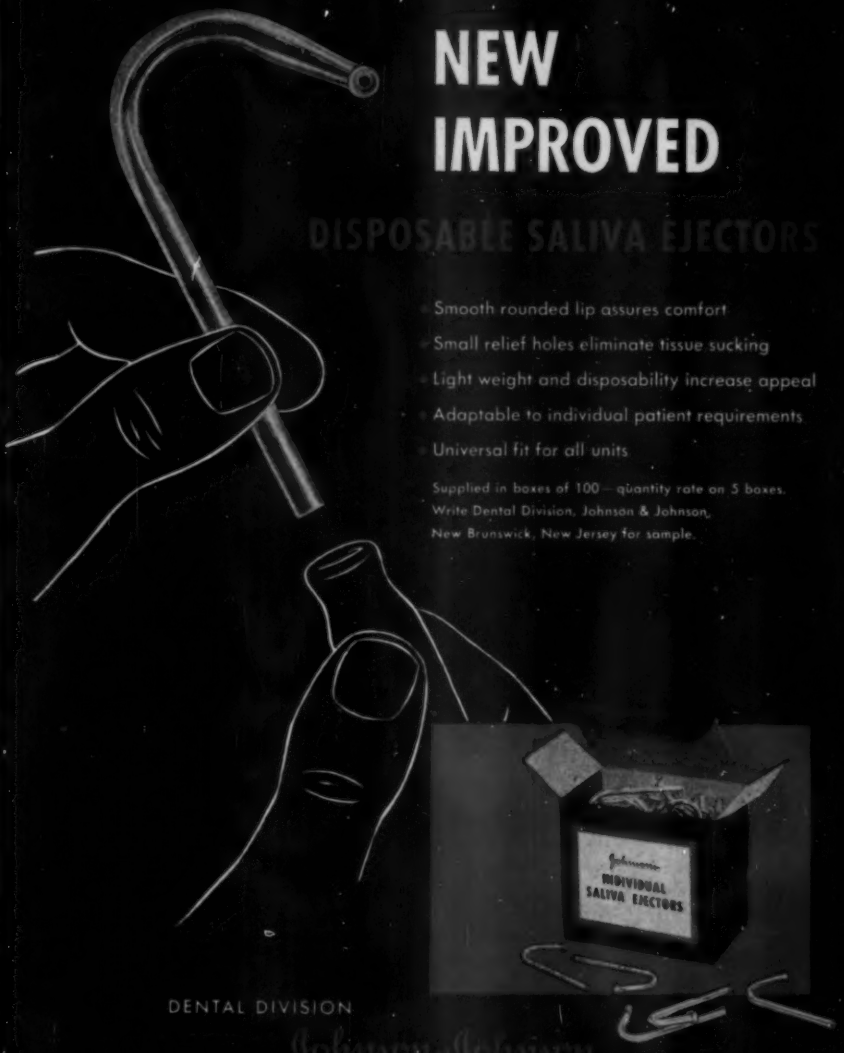

DENTAL DIVISION

Johnson & Johnson

FEBRUARY 1955

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

VOLUME 50 • NUMBER 2

Sterilization, lubrication and rustproofing of dental instruments and handpieces with a water-oil emulsion: laboratory and clinical study

William A. Nolte, Ph.D., and Sumter S. Arnim, D.D.S., Ph.D., Houston, Texas

The purpose of the experiments to be described was to test the efficacy, in the laboratory and in the clinic, of a boiling emulsion of water and oil, first described by Harvey,[1] for sterilizing, lubricating and rustproofing dental instruments.

LABORATORY STUDY

In the laboratory study, 40 dental burs, 40 scalpels, 8 straight handpieces and 8 contra-angles were tested.

The emulsion and control solutions were heated to boiling in standard water sterilizers. Tests were repeated 43 times. Six types of bacterial cultures were used and adequate controls established. The boiling emulsion was found to be as effective as boiling water for sterilization of the inocula tested. It also prevented rust satisfactorily, but not completely. When used correctly it proved to be a good lubricant, comparable to most in use, but not foolproof. In general, these experiments confirm those reported by Harvey.[1]

Foster and co-workers[2] reported on observations made in a study in which a 2 per cent volume to volume (v/v) of a special oil preparation was added to a

From the department of pathology, University of Texas Dental Branch, Houston, Texas.

The handpieces and contra-angles used in the laboratory study were supplied by the Midwest Dental Manufacturing Company. The handpieces and contra-angles used in the clinical study were supplied by the S. S. White Dental Manufacturing Company.

1. Harvey, W.; LeMay, C. H., and Shuttleworth, C. W. Sterilization of dental handpieces. Proc. Roy. Soc. Med. 40:507 July 1947.

2. Foster, J.; LeMay, C. H., and Johnston, K. I. Corrosion of sharp-edged ophthalmic instruments. Proc. Roy. Soc. Med. 38:465 June 1945.

solution containing 2 per cent weight to volume (w/v) of sodium carbonate decahydrate in distilled water. The special oil preparation, according to Harvey[1]

> . . . consists of 95% of a light petroleum neutral oil (containing, approximately, 64% paraffins, 31% naphthenes, 5% aromatics) and 5% of a complex of metallic petroleum sulphonates of molecular weights between 400 and 500 and average composition of the order $C_nH_{2n}SO_3X$-$C_nH_{2n}SO_3X$.

It is known under the brand name of AC 10 (Surgical) or AC 10 Dental Fluid, Midwest Dental Manufacturing Company.

Foster[2] reported that the preparation gave complete protection against corrosion of fine cataract knives without interfering with sterilizing efficiency. Also it was reported to be biologically inert and without effect on the metabolic processes of healing.

Harvey[1] reported the use of the same medium, an emulsion of 2 per cent v/v of the oil preparation plus 2 per cent w/v sodium carbonate decahydrate in distilled water, for sterilizing, rustproofing and lubricating of dental instruments.

The significance to dentists of these reports is the use of the standard water sterilizer and the suitability of the boiling emulsion for rustproofing, lubricating and sterilizing dental handpieces and carbon steel cutting instruments.

According to Le May,[3] Harvey has had about a dozen handpieces, many of them fairly old, in regular daily use in his surgery, all of which were sterilized after each use by the soda emulsion. In 1946 he started using the emulsion regularly, and he has never had occasion to dismantle any of these handpieces. A spot check of the handpieces showed the internal mechanisms to be bright and clean.

Harvey[4] says,

> I have no complaints about the use of AC 10 soda, and find that one of the great advantages is that I keep my surgical burs and needles, and root canal instruments permanently in the sterilizer.

METHODS

Straight handpieces and contra-angles were disassembled completely and degreased, with new scalpels and burs, by immersion in benzene for 10 to 15 minutes. During this period the instruments were agitated, then removed to a vacuum oven and dried at 37°C. for approximately 30 minutes under low pressure.

The instruments were grouped into five sets, each of which, with the exception of the fourth and fifth (designated Culture Sets), consisted of 10 burs, 10 scalpels, 2 contra-angles and 2 straight handpieces.

The first set, called the Test Set, was reoiled with the special oil preparation, handpieces were reassembled. The set was placed in a water sterilizer containing the boiling emulsion. The second set, Control Set 1, was oiled with dental lubricating oil, and the handpieces were reassembled. This set was placed in a water sterilizer containing boiling distilled water plus 2 per cent w/v sodium carbonate decahydrate. The third set, Control Set 2, was oiled with dental lubricating oil, and the handpieces were reassembled. This set was placed in a water sterilizer containing boiling distilled water. The fourth set, Culture Set 1, consisting of 5 burs, 5 scalpels, 1 contra-angle and 1 straight handpiece, oiled with the special oil preparation, then reassembled, was placed in the sterilizer with the Test Set of instruments. The fifth set, Culture Set 2, also consisting of 5 burs, 5 scalpels, 1 contra-angle and 1 straight handpiece, lubricated with dental oil, then reassembled, was placed in the sterilizer with the Control Set 2. All instruments were sterilized prior to in-

3. LeMay, C. H. Personal communication, January 1950.

4. Harvey, W. Personal communication, January 1950.

oculation by boiling in the respective sterilizing mediums for 15 minutes, removed with the aid of sterile forceps, placed on sterile gauze and held in a closed glass container.

Each instrument was removed and checked for sterility prior to inoculation. The technic employed was as follows: Five scalpels were wiped with a single cotton swab which was then streaked over the surface of a plate of culture medium. The same scalpels were then wiped with a second swab which was also streaked over the same plate of culture medium. The procedure was repeated for the remaining five scalpels. Burs were checked the same way. The straight handpieces were checked by wiping about the outside of the spindle with a cotton swab, then by a second swab and finally both swabs streaked over the surface of a plate of culture medium. The inside of the spindle was checked in the same manner as were the chuck and plunger. The contra-angles were tested by swabbing about the gears and also inside the gear heads.

After the instruments were checked for sterility, they were inoculated with each of the following cultures in separate tests: *Serratia marcescens, Micrococcus pyogenes* var. *aureus, Streptococcus hemolyticus, Candida albicans, Bacillus subtilis,* and the mixed microflora of human saliva. Burs and scalpels were inoculated by immersion in a 24 hour culture of the test microorganisms grown in brain-heart infusion or thioglycollate broth, or directly in fresh saliva. The straight handpieces, with a bur in place, were attached to a dental motor and immersed about one inch deep in the test broth culture or in fresh saliva. The dental motor was started and the burs revolved for five minutes at ten second intervals. Contra-angles were inoculated the same way. It required approximately one and one-half hours to inoculate all instruments in each test.

Under this condition, the instruments inoculated at the beginning of the inoculation period were in the process of drying, while those instruments inoculated at the end were wet. From a practical standpoint, these two conditions, wet inoculum and drying inoculum, duplicate more closely the conditions to which instruments are exposed prior to sterilization in office practice. After the inoculation period, the Culture Sets only were checked for presence of these microorganisms with the swab technic described earlier. All inoculated instruments were then placed in their respective sterilizers and exposed to the boiling effect of the mediums for five minutes, removed and checked for sterility by the same swab technic.

In evaluating the cotton swab technic for determining sterility, a set of five inoculated scalpels were exposed to boiling distilled water for five minutes, and then each scalpel was transferred aseptically into a tube of brain-heart infusion broth for culture. Checks of this kind were carried out for several of the different inocula. No growth on culture was obtained for the inoculated instruments when this technic was used. Since these results were the same as those obtained by the swab technic, and the same inocula were used, it was considered adequate for determining sterility of the instruments studied.

The smear-stain method was employed to check the purity of specific cultures and to confirm the presence of spores in the culture of *Bacillus subtilis.* Numerous plating tests were performed to check the sterility of both lubricating oils. No microorganisms grew. To determine whether the oils used would inhibit bacteria, the wet filter paper, dry filter paper and agar cup technics and plating tests were carried out using the test culture *Micrococcus pyogenes* var. *aureus.* Organisms grew from both oils in many of these tests. Careful observation was made to detect the first appearance of rust. Photographs were taken during the

experiment to record comparative amounts of corrosion of instruments. Corrosive effect due to culture media was determined by taking new scalpels, degreasing and reoiling some of them with the special oil preparation or with dental lubricating oil. Several of each were immersed in thioglycollate broth, others in brain-heart infusion broth and some in distilled water for several minutes. They were then removed and placed on a clean paper towel to dry. The thioglycollate broth corroded the scalpels.

The lubricating property of the special oil preparation was judged on a subjective basis. Heat and vibration generated by handpieces while in operation were detected by feeling with the fingers.

RESULTS

Sterilization of Instruments • The effect of boiling emulsion, boiling distilled water plus 2 per cent w/v sodium carbonate decahydrate and boiling distilled water on the survival of various microorganisms is shown in the table. These results represent the readings obtained from three or four tests for each different inoculum except *Bacillus subtilis*. All inocula tested except *B. subtilis* were killed by a five minute exposure to the various boiling mediums.

Only one test was performed using *B. subtilis* with an exposure time of five minutes. Since it grew on subculture, exposure time was changed to 30 minutes, and growth was obtained on subculture for most of the instruments. Consequently the preinoculation sterilization time and the exposure period were changed to 60 minutes. There were several positive subcultures for *B. subtilis* on some of the instruments after these long exposures.

Occasionally growth was observed on subculture with the other inocula throughout the experiment. Smear-stain checks indicated that this growth was the result of air-borne microorganisms

Table • Effect of three boiling mediums on dental instruments inoculated with microbial cultures

Cultures used in inoculating instruments	Sterilization mediums* exposure 5 min.	Number of instruments used for each culture						
		40 scalpels	40 burs	8 straight handpieces			8 contra-angles	
				Outside spindle	Inside spindle	Chuck plunger	Gear head	About gear
Serratia	A	—	—	—	—	—	—	—
marcescens	B	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—
M. pyogenes	A	—	—	—	—	—	—	—
var. aureus	B	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—
Streptococcus	A	—	—	—	—	—	—	—
hemolyticus	B	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—
Candida	A	—	—	—	—	—	—	—
albicans	B	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—
Bacillus	A	+	+	+	+	+	+	+
subtilis	B	+	+	+	+	+	+	+
	C	+	+	+	+	+	+	+
Human	A	—	—	—	—	—	—	—
saliva	B	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—

*A. AC 10 soda emulsion.
B. Distilled water plus 2% w/v sodium carbonate (decahydrate).
C. Distilled water.
+ denotes growth.
— denotes no growth.

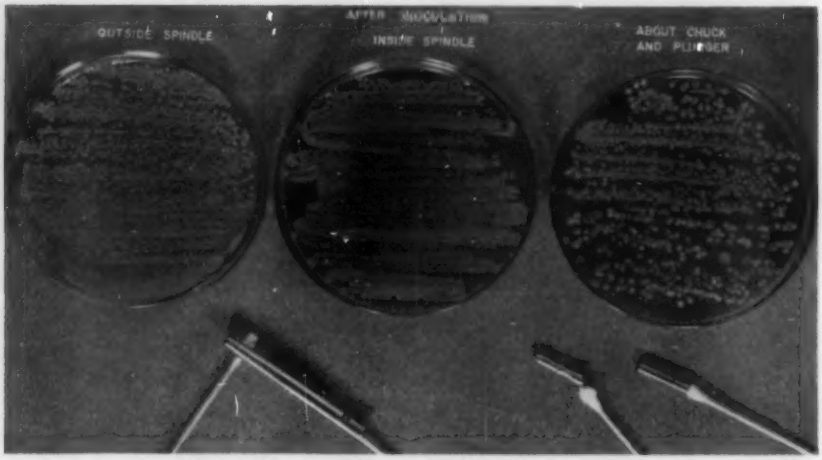

Fig. 1 • Amount of inoculum of Micrococcus pyogenes *var.* aureus *cultured from different parts of straight handpiece*

which contaminated the instruments during the sterility testing manipulations. The air-borne contaminants were aerobic bacilli, micrococci or fungi.

An example of the large amount of inoculum obtained from Culture Sets prior to sterilization is shown in Figure 1. Comparable amounts were obtained from all instruments of the Culture Sets regardless of type inoculum used. The agar plates in Figure 1 were made from a culture of the spindle, chuck and plunger that had been inoculated with *M. pyogenes* var. *aureus.*

Anticorrosive Property of the Special Oil Preparation • The corrosive effect of sterilization in boiling distilled water on the burs and scalpels of Control Set 2, after the first sterilization, is shown in Figure 2. Control Set 1 was affected but to a lesser degree by sterilization in boiling distilled water plus 2 per cent w/v sodium carbonate decahydrate. No changes developed on the Test Set that was sterilized in the water-oil emulsion. A considerable increase in corrosive action after the third sterilization was shown by Control Sets 1 and 2. A comparison between the instruments of Control Set 2 and the Test Set is shown in Figure 3. Sterilizations were continued on both the burs and scalpels used in Control Sets 1 and 2 for comparison with

Fig. 2 • Corrosive action on burs and scalpels after first sterilization in boiling distilled water

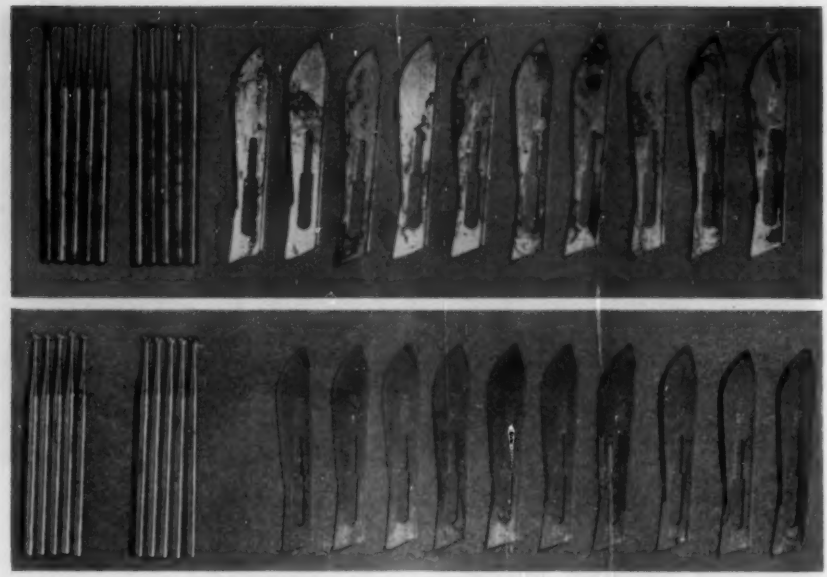

Fig. 3 • Burs and scalpels sterilized three times in distilled water (above) and emulsion (below)

the Test Set, even though they probably would be considered unfit for use after the third to fifth sterilizations. Little change in the amount of corrosion was noted on the Test Set up to the fifteenth sterilization.

Streptococci were used as inoculum for several tests after the fifteenth sterilization. Thioglycollate broth was used for growing the streptococci. It caused excessive corrosive action. Brain-heart infusion broth, the culture medium used in most tests, did not result in greater corrosive effects on scalpels than did distilled water. No comparison was made between the different sets of scalpels and burs after the fifteenth sterilization period.

The first indication of corrosion on the handpieces was noted in Control Sets 1 and 2 after the third sterilization. Figure 4, above, shows the corrosive action on contra-angle and straight handpiece sterilized in boiling distilled water for three periods. No effect was observed on the Test Set after an equal number of sterilizations (Fig. 4, below). At the sixth sterilization, a contra-angle of Control Set 1 jammed. It required degreasing and reoiling for further operation. All handpieces and contra-angles of Control Sets 1 and 2 jammed after the seventh sterilization. Each required degreasing and reoiling before they could be reinoculated. This procedure was required for Control Sets 1 and 2 before each test in order to complete the experiment. The contra-angles and straight handpieces of the Test Set remained free of rust and continued to operate smoothly.

A comparison of the condition of straight and contra-angle handpieces after the forty-third sterilization period

is presented in Figure 5. It was noted that a considerable corrosive action on Control Set 2 accompanied continued sterilization in distilled water. Only slight changes were seen on the instruments sterilized in water-oil emulsion.

Lubricating Property of the Special Oil Preparation • Handpieces and contra-angles oiled with water-oil emulsion seemed to generate slightly more heat and tended to operate a little less efficiently during these studies than comparable instruments that had been oiled in daily practice with the recommended dental oil. At no time did the test handpieces, lubricated with the special oil preparation and sterilized in this water-oil emulsion, operate unsatisfactorily.

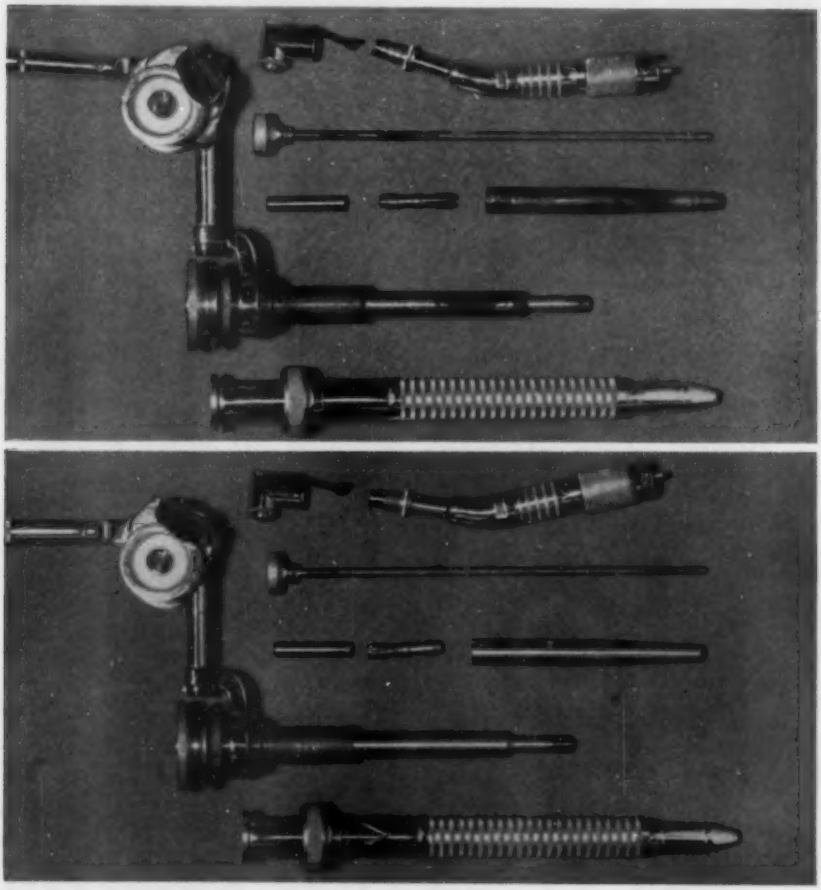

Fig. 4 • Straight handpieces and contra-angles sterilized three times in distilled water (above) and emulsion (below)

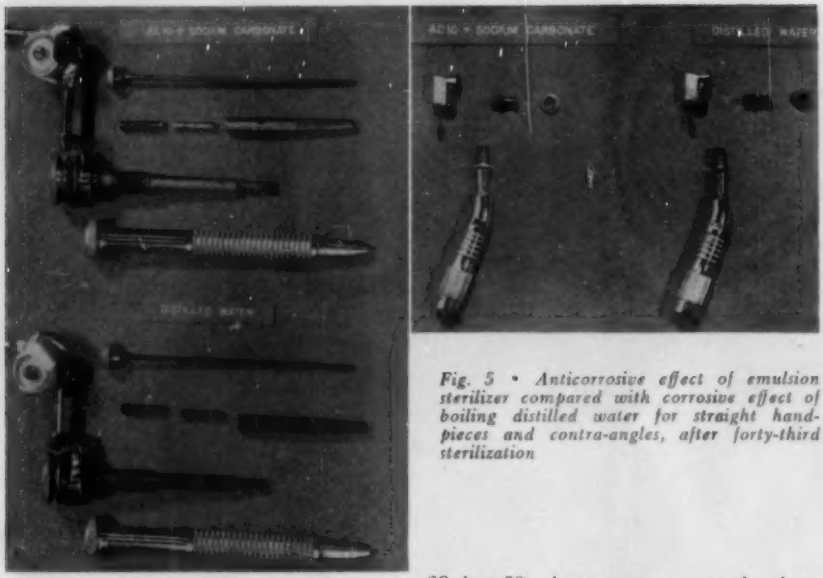

Fig. 5 • Anticorrosive effect of emulsion sterilizer compared with corrosive effect of boiling distilled water for straight handpieces and contra-angles, after forty-third sterilization

DISCUSSION

There were 43 sterilization periods to which the instruments—40 scalpels, 40 burs, 8 straight handpieces and 8 contra-angles—were exposed.

The three different sterilizing mediums, when heated to boiling for five minutes, appeared to be equally effective in killing all inocula except the spore-former.

Although a five minute exposure to boiling has been demonstrated to be effective, it is customary in practice to employ a minimum exposure of 10 minutes boiling (100°C.) to insure a margin of safety in destroying nonspore forming organisms which may be more resistant than those forms used in this study. Harvey[1] reported that a 30 minute exposure to the boiling emulsion was inadequate to insure sterility against a spore-former. The cultures used in our tests contained spores that were able to survive, not only 30, but 60 minute exposures to the three boiling mediums. Cultures were used containing great numbers of spores, as demonstrated by the stain technic. Our spores in brain-heart infusion broth survived 60 minutes at boiling in a thermal death time test. Sterility, in the strictest sense, is not achieved by boiling water or emulsion, with the five minute or even 10 minute exposures which are customarily used in practice.

The anticorrosive property of emulsion is strongly substantiated in this experiment. The addition of 2 per cent w/v sodium carbonate decahydrate to distilled water did not prevent rust, although it is thought to reduce rusting because of its alkalinity. The number of rusty spots developed on the test handpieces was insignificant in comparison with the number that developed on the controls. The rust spots did not interfere with the performance of the instruments. Our results for the handpieces are not in total agreement with those of Harvey[1] in that he reports complete protection against corrosion.

It is possible that some of the corrosive action seen on our instruments may have been the result of the culture broth used in the inoculum. It was shown definitely that thioglycollate broth increased corrosive action on burs and scalpels even though they were sterilized in the water-oil emulsion. This increase in corrosion was not observed on handpieces treated in the same way.

The lubricating property of the special oil preparation appeared to be satisfactory during these laboratory tests. Further studies were made on this subject in the dental clinic and will be reported.

SUMMARY

Instruments inoculated with *Micrococcus pyogenes* var. *aureus*, *Streptococcus hemolyticus*, *Candida albicans*, *Serratia marcescens* or human saliva, respectively, and then exposed for five minutes to either boiling emulsion, or boiling distilled water plus 2 per cent w/v sodium carbonate decahydrate, or boiling distilled water were rendered sterile. Instruments inoculated with the spore-former, *Bacillus subtilis*, and exposed for the same period of time to the sterilizing mediums listed were not sterile. An increase in the exposure time to 60 minutes for instruments inoculated with this microorganism gave positive growth on subculture for some tests.

Instruments sterilized in the emulsion developed little corrosion as compared with the instruments that were sterilized in either boiling distilled water plus 2 per cent w/v sodium carbonate decahydrate or plain distilled water.

Throughout 43 sterilizations, test handpieces exposed to the emulsion medium operated smoothly; whereas, instruments used as controls developed excessive corrosion and required dismantling and regreasing after each sterilization following the seventh period. The emulsion was considered to be a satisfactory, but not a foolproof, lubricant for handpieces when used under the conditions of this study.

Fig. 6 • Anticorrosive effect of special oil preparation soda emulsion and DC silicone for straight handpieces

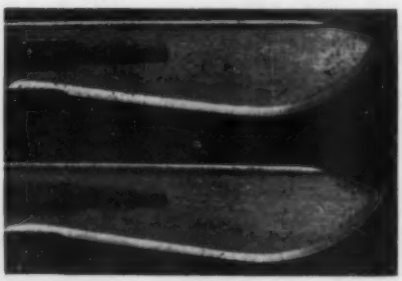

Fig. 7 • Corrosion resulting from exposure of scalpels coated with a standard dental lubricant to boiling soda emulsion

CLINICAL STUDY

The purpose of this part of the study was to test the special oil preparation soda emulsion in the clinic.[1, 2, 5, 6] At the same time a parallel study was made with DC silicone fluid.

The study was divided into three parts as follows:

Part 1. Eight straight handpieces and eight contra-angles were loaned to selected students. These carbon steel instruments were examined daily by the investigators. Half of the handpieces and contra-angles were sterilized approximately 150 times in the special oil preparation soda emulsion, and the remaining half were sterilized approximately 150 times in the silicone fluid. The average number of sterilizations per instrument was about 36. Under the conditions of this study, both emulsion and silicone fluid were found to be satisfactory as rustproofing, lubricating and sterilization mediums.

Part 2. In order to study the general applicability of these mediums for students' use in the dental clinic, two small sterilizers, one containing the special oil preparation soda emulsion and the other containing silicone fluid, were made available to all clinic students for an eight month period. Some students tried both, some tried only one and others used neither. Records were kept by the investigators of the number of sterilizations and of the results obtained with both mediums. Either preparation worked well when the student understood why the procedure was desirable and also how to use the mediums. These experiences indicated that the emulsion could be used to advantage by students for general sterilization of all instruments in the dental school clinic, save those instruments that were made of aluminum, rubber or other substances which are affected by the solution or heat.

Part 3. After the trial period of eight months, the emulsion medium was placed in the large water sterilizer that was used by all students. The emulsion was chosen because it appeared to be best suited for the general clinical procedures. It has been in use for more than one year. Most students find the technic satisfactory, others find it partly so, while many do not use it for sterilization of handpieces.

Occasional failure to obtain satisfactory results during general clinical use of the special oil preparation emulsion appears to be associated with variables in control of instruments and sterilizer that were not present in Parts 1 and 2. In the opinion of the investigators, these variables can be eliminated in a well organized program.

METHODS (PART 1)

The straight handpieces and contra-angles used were disassembled completely and degreased by the same technic as was used in the laboratory study. Four of the straight handpieces and four of the contra-angles, numbered 1 to 4, were reoiled with the special oil preparation and reassembled. The remaining four straight handpieces and four contra-angles, numbered 5 to 8, were reoiled with silicone fluid and reassembled. All straight handpieces and contra-angles were then distributed among eight selected clinic students. Each of the eight students received one straight handpiece and one contra-angle that bore the same identification number. The students were instructed in the sterilization procedure to be used. The students who received straight handpieces and contra-angles oiled with the special oil preparation were told to have their instruments ster-

5. Harvey, W. Sterilisation of dental handpieces. Brit. D.J. 86:126 March 4, 1949.

6. Chirnside, I. M. Use of AC 10 in sterilizers: a report. New Zealand D. J. 49:91 April 1953.

ilized in the emulsion and those who received straight handpieces and contra-angles oiled with the silicone fluid were told to have their instruments sterilized in the silicone fluid.

The sterilization of all test instruments was carried out by a technician, who exposed the instruments oiled with the special oil preparation to boiling (100° C.) emulsion for 10 minutes, the minimum exposure period used for water sterilizers in practice, and the instruments oiled with the silicone to silicone fluid heated to 250°C. for a period of 15 minutes, the recommended temperature and exposure period suggested by the manufacturer of the oil sterilizer. After each sterilization the instruments were removed from their respective sterilizers and were placed in trays which were held on an inclined angle in order to drain excess sterilizing medium. The instruments were sterilized after each time they were used on a patient.

The students obtained their assigned instruments from the technician after sterilization. Before using the straight handpiece or contra-angle, the student was instructed to cover the instrument with a towel and run it for several minutes holding its nose down, so that any excess sterilizing medium within the handpiece would be removed.

If the instruments did not operate smoothly, students were instructed to add a drop of oil to each oil hole, using the special oil preparation or silicone respectively. Each student was instructed to keep a record of the number of times he used his instruments, whether or not they needed any added oil, and to notify the investigators of any abnormal operation. Also, the technician kept an independent record of all sterilizations. At the end of each day, all handpieces were collected after the final sterilization and each was checked by the investigators for corrosion. The instruments were then reoiled by immersion in the respective oils, allowed to drain free of excess oil, and then returned to the technician's desk for sterilization before reuse by the students. If instruments showed corrosion, they were cleaned before reoiling. Random checks for sterility of the instruments were made following the same technic as was used in the laboratory study.

After a one month period, students who were using straight handpieces and contra-angles sterilized in emulsion changed to straight handpieces and contra-angles sterilized in silicone and vice-versa.

RESULTS (PART 1)

Very slight corrosion was observed on three of the four handpieces sterilized in emulsion after three days' use. Before these instruments were returned to the students they were disassembled, cleaned, reoiled with the special oil preparation, reassembled and sterilized in emulsion.

Tests that were made immediately after sterilization occasionally revealed the presence of micrococci from instruments sterilized in both mediums.

After 18 days' use, one of the straight handpieces sterilized in silicone fluid developed a black coat on the spindle which was removed easily by wiping with a towel.

At various times during the experiment, instruments sterilized in emulsion or silicone did not operate smoothly even though lubricant was added. When this occurred, the instruments were completely disassembled, cleaned, reoiled with their respective lubricants, reassembled and resterilized.

Figure 6 shows two straight handpieces after sterilization in their respective mediums — 32 sterilizations in the emulsion and 34 sterilizations in the silicone fluid. Slight blackening can be seen on the bearing surfaces of the spindle of the handpiece sterilized in the emulsion. No changes are seen on the handpiece sterilized in the silicone fluid.

METHODS (PART 2)

Two small sterilizers, one containing the emulsion and the other silicone, were made available to all clinic students. The following instructions were given:

A. For sterilizations of all dental instruments except dental handpieces:

1. Scrub all instruments immediately after use with soap and brush to remove blood, pus, saliva, etc.
2. Rinse thoroughly and dry carefully with cloth.
3. Bring instruments immediately to desk for sterilization and indicate sterilizing medium desired to the technician.
4. If the instrument is not used immediately, it may be dried and dipped or stored in the respective fluids to prevent corrosion.

B. For the sterilization of dental handpieces:

1. Remove all old oil with solvent, and drain. The solvent is used prior to initial sterilization. [Benzene, carbon tetrachloride and Varsol were all used as solvents. Varsol is the brand name of a Standard Oil preparation which contains gasoline solvents and which meets Standard Stoddard's specifications.]
2. Oil with the special oil preparation or silicone fluid, whichever medium is to be used for future sterilizations.
3. Bring handpiece to desk for sterilization and indicate choice of sterilizing medium to the technician.
4. Store in the special oil preparation to insure protection against rusting when instrument is not to be used immediately following sterilization. Instruments sterilized in silicone may be stored in a sterile towel.
5. Before use, hold handpiece in towel with nose down and run for several minutes. Shake well.
6. If additional lubrication is needed during operation, add several drops of respective lubricant.

Students were told to notify the investigators if the handpieces developed corrosion or if they failed to operate correctly. The technician kept a record of the number of sterilizations carried out in both sterilizing mediums.

RESULTS (PART 2)

Approximately 1,814 sterilizations were carried out with the emulsion and 632 with DC silicone. The emulsion sterilizer was larger and accommodated more instruments than the sterilizer containing the silicone fluid. Students seemed to have no decided preference for one medium over the other. The procedure was satisfactory in almost all cases. A few handpieces sterilized in emulsion or silicone jammed. Some carbon steel instruments sterilized in emulsion developed corrosion. Instruments sterilized in silicone were excessively oily and hard to hold in comparison with instruments sterilized in the emulsion. It was difficult to remove the silicone from the instrument surface.

METHODS (PART 3)

The large clinic sterilizer was cleaned and filled with special oil soda emulsion. Instructions, as outlined in Part 2, were given all students. The technician sterilized all instruments in individual containers within the large sterilizer and kept a record of the number of sterilizations. The students were told to inform the investigators of any abnormal developments, such as corrosion of instruments or jamming of handpieces.

RESULTS (PART 3)

The emulsion has been used successfully in the large clinic sterilizer for a little longer than one year. During this time there were approximately 9,893 sterilizations of handpieces and other instruments. Corrosion developed on some instruments and a few handpieces jammed. The amount of corrosion observed was noticeably less than that which developed when boiling water was used for the instruments in Part 1. At times dental cement and other impurities were found on some instruments after removal from the sterilizer. Instruments that were wrapped in paper napkins and allowed to remain therein for more than a week, corroded.

DISCUSSION

In Part 1 of the clinical study, eight straight handpieces and eight contra-angles were exposed to an average of 36 sterilizations in either the emulsion or silicone fluid.

Occasionally microorganisms of the micrococcus type were isolated in the sterility tests from some of the instruments sterilized in both mediums. It is thought these microorganisms resulted from contamination, especially from air, after sterilization, since in the laboratory study such vegetative forms were observed not to survive the boiling effects of plain water for five minutes. It is apparent, therefore, that an exposure of 10 minutes to the boiling emulsion or 15 minutes to silicone fluid at 250°C. is sufficient for surgical asepsis.

Although the handpieces used at the beginning of the experiment were new, some of them did not operate smoothly. A few jammed after several days of use. It is possible that they were defective or were not correctly reassembled after the cleaning procedure. Some that were sterilized in the emulsion revealed slight corrosion after several days of use. No increase in amount occurred as the experiment progressed. The small amount seen did not appear to affect the running quality of the handpieces.

In Part 2, students who used the same two sterilizing mediums reported similar results: some corrosion of carbon steel cutting instruments, some jamming of handpieces, the leaking of medium from handpieces during operation, and the excessively oily feeling of instruments sterilized in silicone. In every instance in which corrosion of instruments or jamming of handpieces was reported, the investigators found variables in the sterilization technic. Handpieces and contra-angles jammed when all of the original lubricant was not removed before re-oiling with either the special oil preparation or silicone fluid. They also vibrated, developed heat and operated poorly when they were reassembled incorrectly.

Corrosion of all instruments appeared to be associated with impurities in the sterilizer and failure to remove blood, saliva or dental materials such as cement. Mixtures of the special oil preparation with a standard lubricant caused pitting on carbon steel instruments (Fig. 7). Although the two sterilizing mediums were not foolproof, students showed a definite preference for them over boiling water for the general purpose of sterilization.

The special oil preparation emulsion was chosen for Part 3 because it appeared to be best suited for general clinical sterilization. The solution was added in correct proportions and was changed once a month, or oftener as needed. No one found instruments sterilized in the emulsion within the large clinic sterilizer to be excessively oily. The corroding of instruments and the jamming of handpieces occurred in some instances, however. This corrosion was due to uncontrolled variables in the technic; for example, instruments wrapped in a paper napkin for a period of more than a week after the sterilization corroded. Tests of the paper with pH indicators revealed an acid pH around 5; consequently the question arose as to whether moisture on the instruments combined with chemicals in the paper to produce the corrosion. Handpieces also jammed which had not been thoroughly cleaned of the original oil and then had been sterilized in the large clinic sterilizer with the special oil mixture emulsion. When possible, these jammed handpieces were disassembled, cleaned thoroughly with Varsol, reoiled with the special oil preparation and reassembled. As far as was known, no further trouble occurred.

Occasional failure to obtain satisfactory results during general clinical use of the emulsion appears to be associated with variables in the control of instru-

ments and sterilizer that were not present in Parts 1 and 2.

This sterilization procedure can be carried out successfully in practice. Several practitioners have studied this technic carefully and have installed it in their offices. They report it satisfactory. Also Chirnside[6] presented a favorable report after a three year test in which the special oil preparation emulsion was used as the sterilizer medium in a dental school clinic.

SUMMARY

Dental handpieces and other carbon steel instruments can be sterilized satisfactorily in the emulsion in a standard water sterilizer. This medium possesses satisfactory antirust and lubricating properties. Added lubrication with the special oil preparation was found desirable in certain instances. Failure of some handpieces to operate smoothly and corrosion of carbon steel instruments are usually associated with mechanical imperfection or errors in technic. These failures are easily corrected once their source is determined.

CONCLUSIONS

1. The emulsion, when heated to boiling for a period of five minutes, is an effective sterilizing medium against the vegetative phase of inocula tested. It is not effective in killing spores.

2. This emulsion is an effective and satisfactory, but not a complete, rust inhibitor.

3. The emulsion when properly used offers an effective and inexpensive means for sterilization, lubricating and rustproofing of most dental instruments.

Problems of the Scientist • Scientific research is conducted largely behind closed doors, and the accuracy of any man's observations and the veracity of his reports depend ultimately upon his honesty. This honesty depends in turn upon maturity, upon some degree of security, and upon a sense of identification and fellowship with competitors. Under present conditions it is a tribute to scientists that violations of their code of honor are so rare that when lapses occur they become historic scandals. This issue is especially delicate in such fields of science as psychology, psychiatry, and psychoanalysis, in which it is difficult to repeat another man's observations for purposes of objective clinical or experimental or statistical confirmation. Consequently in these disciplines, reports of observations become themselves sources of controversy and suspicion. For many reasons I suspect (although I cannot prove this) that we may be seeing today the birth of a new psychosocial ailment among scientists, one which may not be wholly unrelated to the gangster tradition of dead-end kids.

Are we witnessing the development of a generation of hardened, cynical amoral, embittered, disillusioned, young scientists? If so, for the present the fashioning of implements of destruction offers a convenient outlet for their destructive feelings; but the fault will be ours and not theirs if this tendency should increase through the coming years and should find even more disastrous channels of expression.

Certainly the idyllic picture of the innocent, childlike scientist who lives a life of simple, secure, peaceful, dignified contemplation has become an unreal fantasy. Instead, the emotional stresses of his career have increased to a point where only men of exceptional emotional maturity and stability can stand up to them for long, and remain clear-headed and generous-hearted under such psychologically unhygienic conditions. Thoughtful educators are beginning to realize that the socio-economic basis of the life of the scientist must be entirely overhauled; that the psychological setting of his life needs drastic revision; and that at the same time the emotional preparation for a life of research is at least as important as is the intellectual training. *Lawrence S. Kubie, "Some Unsolved Problems of a Scientific Career," American Scientist 42:112 January 1954.*

External thermal applications in postextraction therapy

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External thermal applications were among the first measures employed by man to combat disease. A careful investigation of the literature, however, revealed only one controlled human experiment in which the responses induced on inflammation by the application of heat and cold were compared and evaluated.[1-3] The region of this group of experiments was the graft donor sites of the thigh. It was deemed advisable to determine whether similar responses to these applications would be induced in the oral cavity. It was decided, therefore, to investigate the effects of heat and cold on inflammation and pain in the postextraction period.

In order to evaluate the effects of thermal applications on inflammation, it is worthwhile to review briefly the mechanism of inflammation and response of the tissues to heat and cold.

Inflammation is the reaction of the body to an irritant and tends to localize and destroy the irritating agent. The reaction is the same regardless of the part of the body affected.

The process of inflammation is characterized by a disturbance in the local fluid exchange. This disturbance is caused by an alteration in the normal filtration equilibrium between the small vascular channels, the lymphatics and the intercellular fluid and also by an increase in vascular supply. Redness and heat characteristic of inflammation are the result of the increased blood supply. Swelling and pain result from fluid extravasation and pressure; their cumulative effect causes loss of function.[4, 5]

The dissemination of noxious materials into the systemic circulation is prevented by the laying down of a network of fibrin and by the occlusion of the lymphatic vessels. Localization also may be accomplished by humoral antibodies,[6] which fix organisms at the site of invasion until they are ingested by phagocytic leukocytes. Thus the inflammatory reaction protects the organism as a whole at the expense of local injury. Fortunately, only when the intensity of local injury reaches a certain level does lymphatic blockage

Condensation of thesis submitted to the Graduate School of the University of Pittsburgh in partial fulfillment of the requirements for the degree of Master of Science in oral surgery.

1. Baxter, H., and Entin, M. A. Experimental studies of reduced temperatures in injury and repair in man: structure and potentialities of human skin in temperature control and in defense against thermal trauma. Plast. & Reconstruct. Surg. 2:569 Nov. 1947.

2. Entin, M. A.; Baxter, H., and More, R. H. Experimental studies of reduced temperatures in injury and repair of man: effect of moderate cold and refrigeration on wound healing and regeneration of human skin. Plast. & Reconstruct. Surg. 3:11 Jan. 1948.

3. Baxter, H., and Entin, M. A. Experimental studies of reduced temperatures in injury and repair in man: direct effect of cooling and freezing on various elements of human skin. Plast. & Reconstruct. Surg. 3:303 May 1948.

4. Menkin, Valy. Dynamics of inflammation. New York, Macmillan Co., 1950.

5. Moore, R. A. Textbook of pathology. Philadelphia, W. B. Saunders Co., 1944.

6. Rich, A. R., and McKee, C. M. Study of character and degree of protection afforded by immune state independently of leukocytes. Bul. Johns Hopkins Hosp. 54:277 April 1934.

ensue; otherwise, regional edema would be the inevitable result of any trauma.

Intense heat or intense cold will cause tissue damage. Within indicated thermal limits (8° C. to 45° C.), however, irreversible changes usually are not produced.[7, 8]

The body, with the aid of the circulatory network in the skin, utilizes two methods for the regulation of the body temperature and protection from an unfavorable environment.[9] The application of heat to the skin to a degree sufficiently great to threaten its thermal level is counteracted by a peripheral vasodilatation and the conduction of these thermal excesses to the deeper tissues. There, the normally higher temperature (2° C. to 3° C. higher), and the more extensive circulatory network aid in the dissipation of the heat.[8] The application of cold, on the other hand, is followed by a peripheral vasoconstriction in an effort to prevent heat loss. The body heat is thus maintained by the drastic reduction of blood flow through the cooled region. With the onset of hyperemia, however, a refractory state is produced. Cold applied at this time does not produce the same reduction in temperature as did the prehyperemic application. Therefore, unless the cold were applied immediately after the operative procedure, the theoretical benefits of cold would be mitigated.

Since Spangenberg[10] and Entin[1-3] agree that heat and cold within moderate limits will elicit the same cellular response; since Drinker[11] states that both heat and cold (also within moderate limitations) will result in an increased lymphatic drainage commensurate with the hyperemic response and in addition Boyd[12] and Moore[5] feel that the introduction of an external stimulus with its concomitant inflammation hastens the healing period, it would seem that the immediate application of either moderate heat or cold would be indicated for postextraction therapy.

METHOD

Procedures used in practitioners' offices were duplicated whenever possible, within the limits of a controlled experiment.

The experiment was conducted on patients at the Veterans Administration Hospital, Aspinwall, Pa. Although all of the patients had medical ailments, care was taken to choose only those whose disability would in no way influence their postextraction course. Those with a medical diagnosis of cirrhosis, hypertension, diabetes or other systemic diseases, therefore, were eliminated. None of the patients was debilitated; all were ambulatory. The age group ranged from 19 years to 71 years, with the average being 38 years.

Aside from a complete blood count, test of bleeding and coagulation time and a cleansing of the teeth, there were no preoperative orders or preparations. The extractions were performed in the early morning so that the patients could be observed throughout the day. All patients were cleanly shaven.

Both mandibular and maxillary teeth were extracted for this procedure. The extractions were always multiple involving both right and left first molars and at least one tooth medial and one tooth distal to each molar. The number of teeth extracted averaged 23 per patient. The patients were divided into three groups of 30 patients each. Each group was further subdivided into 15 patients.

Group 1 consisted of those patients who

7. Anderson, W. A. D., editor. Pathology. St. Louis, C. V. Mosby Co., 1948.

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10. Spangenberg, H. D., Jr. Inflammation—a review of the literature. J.A.D.A. 28:259 Feb. 1941.

11. Drinker, C. K., and Yoffey, J. M. Lymphatics, lymph and lymphoid tissue. Cambridge, Mass., Harvard Univ. Press, 1941.

12. Boyd, W. Text-book of pathology, ed. 5, rev. Philadelphia, Lea and Febiger, 1947.

had heat applied to the right cheek area postoperatively. The patients in subgroup A had all their mandibular teeth extracted. The patients in subgroup B had all their maxillary teeth extracted.

Group 2 consisted of those patients who had cold applied to the right cheek area postoperatively. The patients in subgroup A had all their maxillary teeth extracted. These were the same patients who, previously, in subgroup A, Group 1, had had their mandibular teeth extracted. The patients in subgroup B had all their mandibular teeth extracted. These were the patients who in subgroup B, Group 1, had had their maxillary teeth extracted. By staggering the groups, not only could heat and cold be compared with the control on the same patients, but the difference in response to these thermal applications between the maxilla and the mandible could also be noted.

Group 3 consisted of those patients who received the simultaneous application of both heat and cold (heat to the right side of the face and cold to the left side). The patients in subgroup A had all their mandibular teeth extracted. The patients in subgroup B had all their maxillary teeth extracted.

In all, therefore, 60 patients were used.

Tests were made to determine the proper agent for transmitting heat. Conduction and convection agents only were considered, as conversion agents have a limited use outside a hospital. The infrared lamp was chosen for the following reasons: (1) ease of administration by the patient; (2) more efficient, more penetrating heat and (3) constancy of heat. The apparatus chosen was a Burdick Zoalite (Z-12) with a 12 inch reflector at a 20 inch distance.

It was desired to obtain, or create, a practical cooling apparatus which would maintain a constant temperature. Since such an apparatus did not evolve, an ice bag with a half and half mixture of ice and water was utilized. An increase in the temperature of the ice bag at the end of a 30 minute application was noted. The increase in temperature, however, was not great, and its effect on the mucosal temperature was negligible.

After the patient had been seated in the dental chair, bilateral skin and mucosal temperatures were taken prior to the injection of the anesthetic. The mucosal temperatures were taken with the thermocouple in the mucobuccal fold pressed against the alveolus in the first molar region. The skin temperatures were obtained with the thermocouple lightly contacting the skin in the region estimated to be adjacent to the first molar.

The surgery was performed in the dental clinic under local anesthesia. Mandibular blocks with long buccal and mental infiltrations were used for the mandibular extractions. For maxillary extractions, nasopalatine, anterior palatine, tuberosity and infraorbital blocks were used along with some mucobuccal infiltration. The anesthetic agent used was a 2 per cent solution of lidocaine hydrochloride with epinephrine 1:100,000. A period of 15 minutes was allowed after the injection of the anesthetic for maximum benefits to be obtained.

After the severance of the radicular fibers in the gingival sulcus on both the lingual and buccal sides with a no. 15 Bard-Parker blade, the teeth to be extracted were loosened with a straight elevator. The luxations were completed with the forceps of choice. An incision was then made with a no. 15 Bard-Parker blade along the crest of the alveolus, the length of the extracted area, and the mucoperiosteal tissue was reflected with a periosteal elevator. The alveolus was then shaped with a rongeur forceps and a bone file, and the sockets were curetted. The tissue edges were trimmed with scissors, approximated and maintained in position with a continuous no. 000 black silk suture. The postsurgical temperature was then taken, bilaterally, of both skin and mucosa in the manner previously described. The surgical procedure was the

same for both mandible and maxilla.

The thermal application to be used was immediately applied. Bilateral temperatures were taken of the skin and mucosa at 10 minute intervals for 30 minutes. Thereafter, one bilateral temperature reading of skin and mucosa was taken every fourth hour for 12 hours. After the last thermal application (applications were of 30 minute duration every 60 minutes for 12 hours), the interdental papillae, which had been allowed to remain intact bilaterally, were excised. These were fixed in formaldehyde solution, after which the tissues were sectioned and hematoxylin and eosin slides were prepared. Thermal applications of 24 hour duration were ruled out because of interference with the patients' sleep. The placement of either a hot water bottle or ice bag against the cheek during the sleep was considered too haphazard. In addition, pilot experiments showed no great difference in inflammation between the 12 and 24 hour periods.

The temperature measuring apparatus used was a Leeds and Northrup Potentiometer with a constantan-copper thermocouple. The thermocouple had a "U" shape with the open end attached to the handpiece of the Potentiometer. This allowed more coverage than would have been possible with a needle-shaped extension. The galvanometer and thermocouple were calibrated against a known standard by the company. Each division on the galvanometer scale equalled 0.2° C. Readings were estimated to 0.1° C. The standard error was calculated to be 0.2.

Examination of the patients, which continued for 48 hours, was both subjective and objective. Each patient was asked how the thermal applications affected him with regard to pain, tenderness and general comfort when compared with the control (no thermal application) and with one another. The thermal applications and controls were compared in relation to the temperature changes at the skin and mucosal level and to the swelling caused by the inflammatory edema. A comparative microscopic study of the excised tissues for cytologic response was also made.

The following were the postoperative orders administered to all the patients:

1. Heat or cold to the right side of the face; nothing or cold to the left side of the face 30 minutes every hour
2. Penicillin, 300,000 units daily for two days
3. Codeine sulfate, 60 mg., and aspirin, 600 mg., every four hours if necessary
4. Warm saline mouthwash every two hours, to begin 24 hours after extractions
5. Diet as tolerated, either liquids or soft ground foods

The penicillin was used as a prophylactic measure. The analgesic agents are self-explanatory. Warm saline solution was used for oral hygiene, that is, the removal of small blood clots, food debris and mouth odors.

It was recognized that a possible pharmacologic effect of codeine sulfate and aspirin would be peripheral vasodilatation. Since both were administered in the same manner to all patients, this effect on the circulatory system was treated as an uncompensated constant.

RESULTS

The metabolic activity of the skin varies with the temperature, but is always low when compared to other tissues. It would, therefore, be expected to contribute to an external skin temperature that would be lower than the temperature of alveolar mucosa.

It was found that the external skin temperature ranged from 31.7° C. to 34.4° C., with 33.7° C. being the average. The range of the temperature of the alveolar mucosa in the mucobuccal first molar region was from 34.8° C. to 36.8° C., with an average of 35.7° C. The average skin temperature for the three groups,

Table 1 • Average temperature in degrees C. after injection of anesthetic

	Time in minutes							Preanesthetic temperature
	0	5	10	15	20	25	30	
Skin	33.7	33.6	33.7	33.8	33.7	33.7	33.7	33.7
Mucosa	35.7	35.8	35.8	35.6	35.7	35.5	35.6	35.7

therefore, was 2° C. lower than the average alveolar mucosal temperature. In spite of an attempt to get all the patients to close their lips tightly around the handpiece of the temperature measuring apparatus, some air leakage probably occurred with a resultant decrease in the average mucosal temperature. Because this temperature decrease was considered to be slight, no corrections were made, and this error also was treated as a constant.

The following temperature studies were made on a separate group of 25 patients.

After the injections of the anesthetic, temperatures of a separate group of 25 patients were taken every five minutes for 30 minutes. Temperature variations attributable to vasoconstriction should have been manifested in that period. Table 1 shows that little variation resulted.

On the conclusion of this 30 minute period, the extractions were performed. It was felt that temperature manifestations of this procedure should be noted within 15 minutes with readings taken every five minutes. The variations were negligible (Table 2).

An allowance of 15 minutes was also made for temperature variations after reflection of the gingiva (Table 3).

After the alveolectomy and the suturing of the tissues in position, a series of temperature readings was made. First a series of three readings was taken at five minute intervals; followed by one reading 45 minutes after the completion of surgery to determine the transiency of the temperature fall (Table 4). The time limits were not arbitrary, but were set when numerous readings showed no temperature changes beyond the limits cited. An average decrease in the temperature of the mucosa of 1.2° C. was observed after the alveolectomy. This transient decrease was believed to be caused by traumatic vasoconstriction.

Group 1 Results • Prior to consideration of the depth of penetration of either heat or cold, thickness of the cheek of the examined patient was measured. This thickness varied from 10 to 19 mm., with the average thickness being 15 mm. The measurements were made with calipers and millimeter ruler.

It was found that it was best to place the infrared lamp 20 inches from the

Table 2 • Average temperature in degrees C. after multiple extractions

	Time in minutes				Preanesthetic temperature
	0	5	10	15	
Skin	33.7	33.7	33.7	33.7	33.7
Mucosa	35.5	35.4	35.4	35.4	35.7

Table 3 • Average temperatures in degrees C. after multiple extractions and reflection of the gingiva

	Time in minutes				Preanesthetic temperature
	0	5	10	15	
Skin	33.6	33.5	33.6	33.7	33.7
Mucosa	35.2	35.2	35.1	35.2	35.7

Table 4 • Average temperatures in degrees C. after multiple extractions, reflection of the gingiva and alveolectomy

	Time in minutes					Preanesthetic temperature
	0	5	10	15	45	
Skin	33.5	33.5	33.7	33.6	35.8	33.7
Mucosa	34.5	34.7	34.6	34.5	35.9	35.7

skin. When heated, the skin ranged in temperature between 36.5° C. to 39.5° C. with the average temperature being 37.8° C. The average skin temperature, on exposure to the infrared lamp, was, therefore, raised from 33.7° C. to 37.8° C., an average increase of 4.1° C. within 30 minutes. A rapid rise from 33.7° C. to 36.7° C. was noted within the first 10 minutes, the remaining increase occurring within the following 20 minutes. It was determined, therefore, that the elevation of external temperatures was rapid until the temperature of the circulating blood was approximated. Thereafter, the rate of temperature increase was much diminished.

The rise in temperature induced in the alveolar mucosa by the transmission of heat from the skin varied between 0° C. to 1.1° C., the average rise being 0.6° C., using the preanesthetic temperature as the base temperature. A gradient of temperature from 37.8° C. (skin) to 36.3° C. (mucosa), therefore, was obtained through 15 mm. of tissue. No reflex temperature changes were noted on the control side. There was no transfer of either heat or cold to the side opposite the thermal application. For this reason all 60 patients could be used in obtaining a thermal response average.

Twenty-four hours after surgery, each patient was asked which side of his face felt better with regard to pain, tenderness and discomfort; the side to which the heat had been applied, or the side to which nothing had been applied. Sixteen of the 30 patients preferred heat for tenderness and pain, and 17 preferred it for discomfort.

At the time of the subjective questioning, the patients were clinically examined for swelling. No marked difference between the heated and control sides of the face existed with regard to swelling. A microscopic study of the interdental papillae taken from both the heated and control portions of the mandible and maxilla revealed little difference in the inflammatory reaction and cytologic response (illustration, above left and below).

Group 2 Results • The ice bag was wrapped in a towel and held in direct contact with the patient's cheek for 30 minutes. The skin temperature ranged between 18.6° C. and 24.7° C., with an average of 20.8° C. Thus, there was an average decrease in skin temperature of 12.9° C. The fall was constant throughout the 30 minute period.

The ability of the deeper tissues to shield themselves from transmitted cold was well demonstrated. Although the skin temperature dropped 12.9° C., the decrease in temperature of the alveolar mucosa was only 1° C. The range of induced alveolar temperature was from 33.7° C. to 39.5° C., the average being 34.7° C. There existed, therefore, a temperature gradient from 20.8° C. (skin) to 34.7° C. (mucosa).

As previously stated, 24 hours after surgery, the patient was asked to compare that side of the face to which cold had been applied with the control side with regard to pain, tenderness and discomfort. The replies were more evenly divided than were those concerning heat. Sixteen patients preferred the application of cold for pain, 16 preferred it for tenderness and 16 for discomfort.

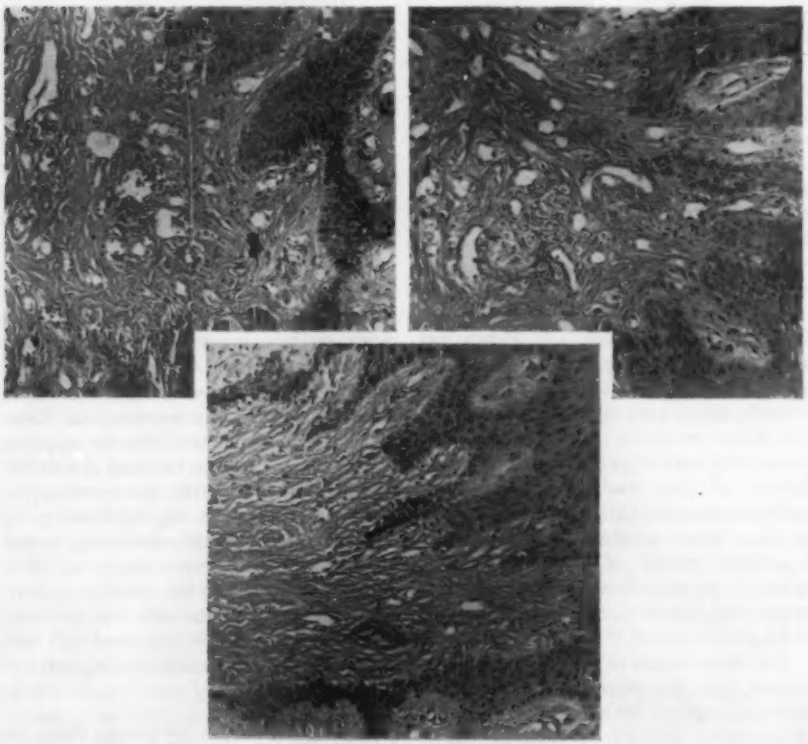
Clinical examination revealed no great difference in swelling between the control and the cooled areas. The illustration, above right and below, shows a similar cytologic and inflammatory re-

sponse. It was noticed, however, that in the second 24 hour period an intolerance of cold became marked. This will be discussed further under Group 3 results.

Group 3 Results • The thermal applications were utilized here as they were for Groups 1 and 2. It had been hoped that by discarding the control a direct comparison between the thermal applications would be facilitated. Since the absence of a reflex reaction precluded any temperature interference, those gradients and temperature reactions obtained for the first two groups also apply to Group 3. A composite of average temperatures in degrees Centigrade is shown in Table 5.

Here, as in Group 1, there was a slight preference for heat with regard to pain, tenderness, and discomfort. Sixteen preferred heat to cold for pain, 16 for tenderness and 15 for discomfort.

After the first 24 hours, however, an increasing aversion to the application of cold became apparent. Not only was general comfort decreased, but some patients complained of pain that was relieved only by the discontinuance of the use of the cooling agent. Twenty-one patients now preferred heat to relieve pain and tender-



Postoperative inflammatory reaction in interdental papillae. Above left: After application of heat. Above right: After application of cold. Below: No thermal application

Table 5 • Average temperatures in degrees C.

	Skin	Mucosa
Preoperative	33.7	35.7
Postoperative	33.6	34.5
Heat	37.8	36.3
Cold	20.8	34.7

ness; 22 preferred heat to relieve discomfort.

The warm saline solution, although initially prescribed as a hygienic measure, was chosen by all 30 patients as an aid to general comfort.

There was a negligible difference in the degree of swelling between sides of the face. Edema, when present, however, was more noticeable in the mandible than in the maxilla.

The change in temperature of the alveolar mucosa induced by the external thermal applications varied inversely with the thickness of the cheek. The thicker the cheek, the greater the distance of thermal transmission and consequently, the less heat or cold reaching the alveolar mucosa.

DISCUSSION

Pain and temperature are conducted mostly in the head region over the trigeminal nerve and to a slight extent by the seventh, ninth and tenth cranial nerves. The fibers terminate in the cortex of the postcentral and adjacent gyri. The dissociation of pain and temperature occasionally occurs clinically and is claimed to have been produced surgically by superficial section of the ventral part of the lateral funiculus of the spinal cord; in general, however, these fibers appear to be greatly mixed.[13]

The direct cause of pain is not lack of oxygen, but the stimulation of sensory nerve endings by the metabolic products of muscular activity. Ordinarily, these are removed by oxidation, but they accumulate when the blood supply is inadequate. This pain factor is believed to be a nonvolatile acid, possibly lactic acid.[14] This condition may be likened to ischemia; therefore, the alleviation of pain by means of a stimulating agent applied to the skin which elicits peripheral vasodilatation probably depends on the associated tissue hyperemia. By increasing the volume of blood circulating through a part of the body, the concentration of the irritating substance is reduced to a level below that required to stimulate the pain receptors.[8] The pain reducing properties of heat and cold are thus explained. Once the acute inflammatory stage has reached a point of stasis, although the change in temperature at the mucosal level is not great, the over-all effect of the temperature gradient may be sufficient to initiate a circulatory response to relieve the neuralgic symptoms. This, in addition to the antispasmodic muscular effect of heat, will help increase the comfort of the patient. It may be for this reason that there was a noticeable preference for heat in the second 24 hours after surgery.

Cold, in itself, is an anesthetic agent. That point at which the direct paralytic influence of cold begins to predominate, however, is far below the range attained by the thermal agents used in this experiment, or these agents as generally used in the office or home.

Upon application of cold, it was found that the fall in temperature was three times the rise obtained with the application of heat. This was believed due to the greater tissue tolerance for extremes in applied cold than in applied heat.

Cold was applied periodically rather than continuously for two reasons: (1) mild hypothermia of the tissues for a protracted period may be sufficient to injure the capillary endothelium and (2) because of vasoconstriction, cooling extracts

13. Rasmussen, A. T. Principal nervous pathways, ed. 3, reissue. New York, Macmillan Co., 1947.

14. Best, C. H., and Taylor, N. B. Physiological basis of medical practice, ed. 5. Baltimore, Williams & Wilkins Co., 1950.

heat largely from the peripheral tissues, and this heat loss is not made available to the deep tissues until there is a redistribution of temperature between these hot deeper tissues and the cold periphery. This redistribution is accomplished only by a return of blood flow to the skin after cooling is stopped,[15] the cooled blood being carried to the deep tissues. Heat was applied periodically, for even during periods of low intensity, the rate of injury exceeds the rate of recovery by a narrow margin.[7]

It was felt that the comparable results obtained by the use of heat, cold and the control were attributable to the relatively low intensity of the responsible thermal agents. That the cellular response to moderate trauma, heat and cold is the same is confirmed by this experiment.

Wells[16] has propounded that a thermal gradient, which does not cause pain in normal tissue, will, when added to injured tissue which is painless at the moment, result in a summation phenomenon that may give rise to pain. He arrived at this conclusion by clamping a metal serrefine to the web between two fingers. The moderate pain which occurred was abolished by warming the clamp and surrounding area to the temperature of the deep tissues, thereby neutralizing the temperature gradient. Wells also felt that an insulating cover over the painful area would be instrumental in obtaining temperature neutralization by preventing surface cooling.

It seems, however, that this experiment also proves that pain is a metabolic rather than a surface cooling phenomenon. The addition of an insulating medium will result in a rise in temperature of the part shielded, and the metabolic irritants are then removed by the concomitant increase in circulation. The neutralization of the temperature gradient merely aids in the circulatory removal of the pain-causing factor.

This work, therefore, substantiates the findings of Entin[1-3] and Spangenberg,[10] and establishes the concept that the immediate postoperative application of either moderate heat or moderate cold will give equal results in the control of discomfort, pain and swelling for the first 24 hours after surgery. The patients who stated that the nontreated postoperative site was not generally as comfortable as those sites treated by thermal applications, of course, were giving subjective answers. The equality of the physiologic and cytologic response to heat, cold and to nothing was demonstrated in the first 24 hours after surgery.

A postoperative therapeutic measure complying with the requirements for rapid, comfortable healing would seem to be the pressure dressing, as it acts as an external stimulus, limits inflammatory edema without interfering with the cellular response and, by inducing an increase in temperature and the circulatory response, aids in the dissipation of nerve irritants. Pressure dressings have long been used where either extensive edema or interference with blood supply to the operated area would mean disaster. The physician has the advantage of ease of application of dressings to external areas. The application of a splinting device to the alveolus should not prove insurmountable; for example, excellent, comfortable healing occurs with the insertion of properly made immediate dentures after extractions and alveolectomy.

CONCLUSION

Heat and cold were applied externally to the skin of the shaved face of 60 patients 30 minutes every hour for 12 hours as a postextraction form of therapy. The effects of the thermal applications with

15. Eichna, L. W. Thermal gradients during varying body temperatures, with particular reference to changes during application of external cold in patients with noninfectious fevers. Arch. Phys. Med. 29:687 Nov. 1948.

16. Wells, H. S. Temperature equalization for the relief of pain: experimental study of relation of thermal gradients to pain. Arch. Phys. Med. 28:135 March 1947.

regard to comfort and the inflammatory response were compared with one another and with the control.

The following conclusions were derived:

1. Moderate thermal applications to the skin of the face cause little change in the temperature of the alveolar mucosa.
2. There was a greater change in mucosal temperature with the application of cold, because of the greater intensity of the cold applied.
3. There was little difference in pain, tenderness or general comfort as a result of applications of heat or cold during the first 24 hours.
4. There was little difference in swelling or cytologic response caused by applications of heat, cold or nothing during the first 24 hours.
5. There was a noticeable preference for heat (extraoral or intraoral) with regard to comfort during the second 24 hours. This preference is believed due to the antispasmodic effect of the heat on the facial muscles in the traumatic areas.
6. Heat or cold applied to only one side of the face did not affect the temperature of either the skin or mucosa of the opposite side of the face. There was, therefore, no reflex systemic response to the applied agent.
7. There was a transient drop in mucosal temperature following alveolectomy and suturing of previously reflected mucosal tissue because of traumatic vasospasm.
8. There was no demonstrable difference in the rate of healing in the region of the control, applied heat or applied cold.

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An inorganic qualitative and quantitative analysis of green stain

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Green stain is a pigmented deposition on the coronal portions of the teeth. The stain occurs in all age groups, but it is most common in children. In the late nineteenth century, various theories were postulated concerning the etiology of the stain. Since that time the only work conducted has placed emphasis on the incidence of the stain. Work on the etiology of the stain has never progressed beyond the hypothetical state.

The gross appearance of the stain as described by Ayers[1] varies from a dark green to a light yellowish-green color, with several intermediate gradients. The dark green stain is usually found in scanty amounts about the gingival areas of the teeth, and the deposits seem to be associated with relatively clean mouths. The lighter varieties of stain are pellicle-like and are found most frequently in mouths which are hygienically bad.

The two varieties of stain occur with about equal frequency. Streaks running

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1. Ayers, Polly. Green stain. J.A.D.A. 26:2 Jan. 1939.

gingivoincisally can be found in combination with both the light and dark stains. The manner in which the deposits form seems to be, at times, dependent on the structure of the enamel surface and the adjacent structures which alter the masticatory movement and excursions of the mandible.[1]

The findings of various investigators regarding the incidence of green stain are, for the most part, in agreement. The stain is found most often on the labial surface of the upper anterior teeth. The upper posterior teeth stain only slightly, and when a deposit is observed it is usually found on the buccal surface. The lower teeth stain to a lesser degree, and the accumulations are noted on the labial, buccal and lingual surfaces with equal frequency.[2]

It has been reported frequently that green stain has the highest incidence in children with poor oral hygiene. Of the 35 children examined by Ayers,[1] more than one half brushed their teeth less than once a week. The remainder brushed their teeth from 4 to 21 times. These findings might indicate lax oral hygiene in the susceptible individual, but nothing conclusive can be derived from these statistics.

Apart from its bad esthetic effect, the stain has a degenerative effect on the tooth itself. This is illustrated by the eroded surface observed on the tooth after the removal of the stain. The decalcification may be a result of the stain, or it may be a predisposing factor and be caused by the poor oral hygiene in these susceptible individuals. After removal, the stain has a tendency to recur.

Attempts have been made to correlate the stain with caries, race, age, missing teeth, Nasmyth's membrane, and diet, but little definite relationship has been established.

The belief that the green coloring matter is chlorophyll is contradicted by the fact that it is not soluble in ether.[3] The occurrence of green stain is still unknown and its true nature undefined. In the past ten years, several investigators have studied the clinical aspect of green stain, but comparatively little significant research on the etiology of the stain has supplemented the original investigations of Ottolengui[4] and Miller[5] done more than a half century ago.

ETIOLOGY

The green stain theory which has been given the greatest recognition states[6] that these green deposits are probably formed by the growth of certain forms of chromogenic mouth bacteria which have attached themselves to the remains of Nasmyth's membrane. An experimental fact, however, which throws doubt on this theory is that green stain has reappeared on some patient's teeth after a thorough prophylaxis. Such a prophylaxis would have removed all traces of Nasmyth's membrane. Instances of green stain have been found in adults, as well, even though Nasmyth's membrane has been worn away by attrition and mastication.

Practically all of the theories on the etiology of green stain have been based on clinical experience and supposition; however, there has been some bacteriological work carried out on this particular subject.

Berke[7] pioneered the definitive bacteriological approach to green stain by describing a smear of coronal tartar. Berke found that:

2. Daub, John, and Fontanella, Guido. Green stain. Senior thesis, Baltimore College of Dental Surgery, University of Maryland, 1951.

3. Burchard, Henry, and Inglis, O. E. Dental pathology and therapeutics for students and practitioners. Philadelphia, Lea & Febiger, 1912, p. 314-315.

4. Ottolengui, R. Methods of filling teeth. New York, S. S. White Dental Mfg. Co., 1892, p. 157-159.

5. Miller, W. D. Deposits upon teeth with special reference to green and metallic deposits. D. Cosmos 36:253 April 1894.

6. Marshall, J. S. Principles and practice of operative dentistry. Philadelphia, J. B. Lippincott Co., 1901, p. 577.

7. Berke, Joseph. Etiology and histology of dental tartars. D. Cosmos 77:134 Feb. 1936.

. . . mycelial threads formed a considerable portion of the tissue. A number of phagocytes and a few epithelial cells were visible. Bacterial stains disclored a large number of Gram-positive cocci dispersed throughout the deposit. Bacilli were few in number. Some spirochetes and fusiform bacilli were present. The organic substances consisted of all these components, namely, fungi (mycelial threads), bacteria (mostly cocci), phagocytes (mostly polymorphonuclears), and very few epithelial cells. Blood pigments and organic stains, e.g., nicotine, gave the tartar the characteristic coloring.

In this description, the normal flora of the mouth has been pointed out.

The list of possible causative organisms has reached formidable proportions. Some investigators have identified the following organisms as being responsible for the stain: *Leptothrix buccalis*,[6] *Penicillium glaucum* and *aspergilli*.[8] The aspergilli settle on every moist surface exposed to air and are active producers of oxalic and other organic acids, the presence of which may thus account for the decalcification of the enamel.[9] Other chromogenic organisms are *Micrococcus viscosus, Staphylococcus viscosus, Bacillus liquefaciens fluoresceus motilis, Bacillus pyocyaneus,* and *Bacillus fluoresceus non-liquefaciens*.[10] Those workers who hold the Nasmyth's membrane theory believe that these chromogenic oral organisms attach themselves to the membrane or its remnants, produce a green coloration and cause, by the formation of acid, the decalcification and erosion of the enamel surface.

Miller[5] regards bacteria not as the direct coloring agent in the stain, but as the cause through the production of hydrogen sulfide gas and its resulting formation of sulfomethemoglobin or some allied substance from gingival hemorrhage.

Some workers attribute stain formation to the contact of mucin in the dental plaque with the coloring matter in foodstuffs, such as carotinoids, flavones, anthocyanins, and chlorophyll. It is the contention of Haesler and Fain[11] that these substances are precipitated by the mucin of the plaque material with which they come in contact, and the plaque then assumes the color of the precipitate. Essentially, their theory is that green stain is nothing more than precipitated chlorophyll.

No doubt all the theories that have been presented on green stain have some justifying points; however, it is evident that the true etiology of this condition has yet to be described.

As has been pointed out here, most workers are in agreement concerning the coloration, locale of occurrence, general description, and incidence of green stain. Many dentists still hold passively to the Nasmyth's membrane-chromogenic organism theory, even though it has been clinically and experimentally demonstrated that the etiology of this stain does not depend entirely on the presence of Nasmyth's membrane. The theory of systemic factors and the secondary effects of chromogenic bacteria and their metabolites in the production of the stain is favored by the present authors.

INVESTIGATION

The object of the present investigation was to present some evidence as a result of microchemical analysis that would support one or more of the old theories or would be the basis of a new theory on the etiology of green stain.

Subjects used in this investigation on green stain were selected from patients in the operative clinic and from private institutions in the Baltimore area. Approximately 150 patients were examined, but the teeth of only 23 presented the stain in sufficient amounts to be utilized

8. Sedanes, Bernard. Role of fungi in deposits upon the teeth. D. Cosmos 75:1154 Dec. 1933.

9. Zinsser, Hans. Textbook of bacteriology, ed. 6. New York, D. Appleton & Co., 1927, p. 837.

10. Goadby, K. W. Mycology of the mouth. New York, Longmans, Green & Co., 1903, p. 24-25.

11. Haesler, Kurt, and Fain, J. M. Discoloration of teeth. D. Cosmos 77:878 Sept. 1936.

in this study. Routine questionnaires were filled out for this latter group of patients, and the following data were recorded: age, sex, height, weight, race, diet as well as the medical and dental history. At this time the oral condition and hygiene were appraised. The conclusions derived from these data were in agreement with the work previously reported by Ayers[1] and Daub and Fontanella[2] and are not here included.

METHOD

In all subjects the stain was removed from the upper anterior teeth. The area was first rinsed with water and then dried with cotton and chip blower. The stain was removed from the teeth with a prophylactic scaler and placed in a concave slide. To this sample approximately .01 milliliter of distilled water was added. The pigmented material was then broken up into fine particles and dispersed through the water. The water containing the stain was then aspirated into capillary tubes and the ends were sealed by flaming. The capillary tubes were then stored in a refrigerator.

After a sufficient number of samples were collected (23), they were combined into a gross specimen, placed in a porcelain crucible, and heated in an oven for 24 hours at 100° F. After this heat treatment, designed to drive off all moisture, the specimen was placed in a desiccator with calcium chloride to maintain the dry state.

A one meter spectrograph was used in the analysis of the collected stain. The specimen was placed in a carbon crucible, fired by an electric arc, and the resultant spectral lines were recorded on 35 mm. panchromatic film which was situated adjacent to the scale in the spectrograph. The film was developed, dried, and then placed in a projection comparator-densitometer. With this instrument, the density, as well as the identity of the spectral lines of the specimen, was determined. Thus, both qualitative and quantitative inorganic analyses were determined.

The following results were noted: greater than 10 per cent, calcium; from 1 per cent to 10 per cent, potassium, sodium, silicon, magnesium, phosphorus; less than 1 per cent, aluminum, iron, lead, manganese, boron, copper, silver, titanium, nickel, barium, strontium.

DISCUSSION AND CONCLUSION

The approach used in this investigation on green stain parallels one phase of Vallotton's[12] work on brown stain; that is, the inorganic quantitative and qualitative analyses of brown stain. The clinical observation of the chromatic difference of the brown and green stain is chemically demonstrated by comparing the results of the analyses.

The elements common to both stains were calcium, iron, silicon, magnesium, lead, manganese, phosphorus, silver and sodium. Those elements found in green stain and not in brown stain were aluminum, barium, nickel, boron, copper, titanium, strontium and potassium. Tin and chlorine were found in brown stain but not in green stain.

The elements copper and iron can be regarded as blood tracers; thus, support is given to Miller's theory. The hypothesis arrived at by Miller[5] indicates that the stain is composed of a bluish-green sulfomethemoglobin. The reaction of hydrogen sulfide and blood can be carried out readily *in vitro* to produce this pigment. It is possible that in the mouth a similar reaction involving bacterially produced hydrogen sulfide gas and blood from gingival hemorrhage could result in the formation of the pigment found in green stain.

The subjects from whom the stain was

12. Vallotton, Charles. An acquired pigmented pellicle of the enamel surface. J.D. Res. 24:161 June-Aug. 1945.

procured for this study presented varying degrees of gingival inflammation which ranged from slightly inflamed gingivae to frank gingival hypertrophy. Every mouth which was examined exhibited poor oral hygiene; materia alba was present on all the teeth, and blood was readily expressed from the gingival tissues.

From the authors' observations, the formation of green stain was always associated with lax oral hygiene and gingival inflammation. Therefore, it is possible that the true etiology of this condition probably lies in the relationship of the bacteria-laden debris to the gingival hemorrhage.

Construction of an autopolymerized acrylic jacket crown by direct technic

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The autopolymerizing acrylic resins in their present stage of development are somewhat less than ideal for the construction of dental restorations. However, if their shortcomings are taken into consideration and compensated for, they may be useful in certain procedures. A satisfactory plastic resin jacket crown can be constructed by a direct technic using one of several acrylic filling materials. The advantage of such a crown lies primarily in the fact that it can be completed in one sitting. It will resist breakage because of its elastic qualities and if properly handled will produce an esthetic and relatively permanent restoration.

The unfavorable characteristic of comparative weakness of the material can be compensated for to some extent by incorporating Fiberglas in the restoration.

In a comparatively short period of time (a year more or less), these materials have a tendency to turn yellow because of oxidation of the activator. If a plastic tooth designed for use on a removable denture is hollowed out and used as a veneer on the restoration, the undesirable quality of color instability is overcome.

Polymerization shrinkage may be offset by using the nonpressure technic. A no. 00 or 000 sable brush is moistened with liquid and then is used to moisten and carry several granules of powder to the tooth.

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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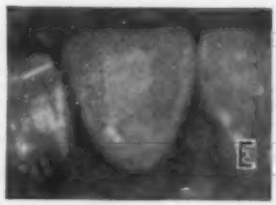
Construction of autopolymerized acrylic crown by direct technic. A: Crown hollowed out from lingual aspect. B: Filling material painted on Fiberglas thread wrapped around preparation. C: Resin painted on lingual surface of restoration. D and E: Crown cemented in place



When this technic is followed, the shrinkage takes place a little at a time as the crown is laminated. The over-all shrinkage of the entire crown is considerably reduced. Most of the shrinkage takes place from the outside of the crown; therefore, the final fit is accurate. There seems to be little danger to the life of the pulp.

Technic • The tooth is prepared in the usual manner. In most instances it is advisable to prepare a shoulder somewhat larger than might be used for similar types of crowns to allow for incorporation of the Fiberglas reinforcement. A stock plastic tooth somewhat larger in size than the finished restoration is selected so that it may be ground to the desired size and shape.

After the selected plastic tooth has been ground to approximately the right size, it is hollowed out from the lingual aspect. It is desirable to leave the mesial and distal portions intact for better retention and esthetics (illustration, A).

The preparation is then lubricated with a thin coat of petrolatum, and a thin veneer of autopolymerizing resin is painted on. Although this material has no adhesive properties, the shrinkage may make the resin difficult to remove for final shaping and cementation if the preparation is not lubricated. This veneer is then allowed to set for three to five minutes. A bead is painted on the mesial and distal incisal angles to help retain the Fiberglas thread reinforcement. After this veneer has set, a layer of Fiberglas thread is wrapped around it, and another thin layer of filling material is

painted on to retain the Fiberglas permanently (illustration, B).

The stock tooth is then ground to fit the gingival and labial surfaces of the preparation. It is filled with autopolymerizing resin and is placed over the veneer containing the Fiberglas.

The lingual surface of the crown is painted in and allowed to set for five minutes (illustration, C). The entire crown is removed from the preparation and allowed to set for ten minutes.

The excess is then trimmed off the shoulder area. The lingual aspect is shaped and adjusted to the occlusion. At this time the final shaping of the crown is done. The Fiberglas must be entirely covered as it cannot be polished.

The shoulder of the crown is then painted with autopolymerizing acrylic resin, and the crown is placed on the lubricated preparation under pressure. This step will compensate for any shrinkage that may have taken place around the shoulder area, thus insuring an accurate fit. After three to five minutes setting time, the crown is again removed from the preparation, and any overhang is trimmed off. The crown is then polished and placed on the preparation. The gingival margin is checked for overhang or discrepancies.

The finished crown is removed from the preparation, any lubricant that might remain is cleaned off and the crown is cemented in place (illustration, D and E).

Summary • A satisfactory plastic jacket crown can be constructed by the direct method if the operator uses a technic designed to compensate for the unfavorable properties of the material.

In the technic described the weakness of the material is compensated for by the incorporation of Fiberglas thread.

The color instability is taken care of by using a stock plastic tooth to cover the visible portion of the crown.

This technic does not appear to be harmful to the pulp.

Science Budget • In the current fiscal year, which ends June 30, 1955, the U. S. Government is spending $2 billion on scientific research and development, a decline of about $200 million from the year before. Cuts in spending for new plant and for applied research and development account for the decrease. The allowance for basic research this year is $131 million, an increase of $10 million. These are some highlights of the National Science Foundation's third report ***Federal Funds for Science.***

Of the 1955 total $1.5 billion will be spent on physical sciences, $211 million on life sciences and $37 million on social science, including $18 million for collecting general-purpose statistics. *"Science and the Citizen," Scientific American 191:54 December 1954.*

Effect of a stannous fluoride-containing dentifrice on caries reduction in children
II. Caries experience after one year

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The idea of using a lower level of fluoride than commonly employed in the technic of topical applications but applying it more frequently to increase partially resistance to dental caries is not new. In commenting on this subject Bibby[1] stated:

> It seems obvious that if infrequent treatment can cause such definite changes in the progress of caries, more frequent treatments, the use of improved techniques of application or treatment using a more active fluorine reagent might accomplish a great deal more in the control of dental decay.

In this respect the use of a fluoride dentifrice might be ideal, since it would combine frequent applications with maximum convenience, because the fluorine would be applied as part of a regular oral hygiene procedure.

The data obtained on a stannous fluoride dentifrice reported in this study are the result of several years of intensive effort to find a highly active anticaries compound and a means of keeping it effective when incorporated in a dentifrice. The first report[2] indicated that after six months of unsupervised use of a paste dentifrice containing stannous fluoride, the dental caries rate in children was reduced 53 per cent in DMF teeth and 71 per cent in total DMF surfaces. Since one of the important considerations of the utility of such a dentifrice is its continued effectiveness, this report presents the findings at the end of one year.

EXPERIMENTAL PROCEDURE

The method of conducting the study has been reported in detail.[2] Five hundred and fourteen children were divided in two groups according to an estimate of their "caries expectancy." The two groups of children were provided with dentifrices which were identical except that one contained 4,000 ppm stannous fluoride. This means that approximately 1.0 mg. fluorine and 3.0 mg. tin as stannous fluoride were used per gram of dentifrice. The composition of the dentifrice was as follows: heat-treated calcium

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Contribution no. 660 from the chemistry department, Indiana University, Bloomington, Ind.

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†College of Dentistry, Ohio State University, Columbus, Ohio.

1. Bibby, B. G. Use of fluorine in the prevention of dental caries. II. Effect of sodium fluoride applications. J.A.D.A. 31:317 March 1944.

2. Muhler, J. C., and others. Effect of a stannous fluoride-containing dentifrice on caries reduction in children. J. D. Res. 33:606 Oct. 1954.

Table 1 • Average increase in caries experience for one-year period

	Children	DMFS in previously caries-free teeth	DMFS in previously DF teeth	DMFS in teeth erupting during test	New proximal surfaces decayed	New occlusal surfaces decayed	New buccal and lingual surfaces decayed	Total new DMFS	New DMFT
Group 1*	209	1.45	1.27	0.30	1.29	1.09	0.63	3.01	1.31
Group 2†	214	0.86	0.48	0.19	0.21	0.77	0.55	1.55	0.65
Percentage decrement in caries rate		40.5	62.1	37.9	83.7	29.8	12.8	49.3	50.6
Probability		<.001	<.005	<.014	<.00001	<.014	>.05	<.0001	<.00001

*Control group
†Stannous fluoride group

orthophosphate, 42 per cent; detergent (nonsoap), 2 per cent; humectant, 25 per cent; water, 29.2 per cent; binder, 1.4 per cent; stannous fluoride, 0.4 per cent and flavor. The children composing Group 1 received the nonfluoride dentifrice, whereas the children in Group 2 received the stannous fluoride dentifrice. The use of the dentifrice was not supervised. The children, ranging in age from 5 to 15 years, returned to the dental clinic at six month intervals in order to receive a dental prophylaxis, complete bitewing roentgenographic examinations and clinical dental caries examination.

DATA AND DISCUSSION

After one year of participation in the experimental dental caries program, 423 children returned for re-examination. Table 1 shows the average dental caries increments in terms of new DMF teeth and total new DMF surfaces along with various components of DMF surfaces in the two groups of children. Use of the stannous fluoride dentifrice resulted in a decrement in caries rate of 50.6 per cent in teeth which were noncarious at the time of the initial examination and a 49.3 per cent decrement in caries rate in all new DMF surfaces. The decrement in terms of total DMF surfaces is highly significant with a probability less than 0.0001. These estimates of effectiveness obtained at the end of the first year are somewhat lower than those obtained after six months.

The effect of the stannous fluoride-containing dentifrice on previously carious teeth is of special interest. There was a decrement of 40.5 per cent at the end of one year in DMF surfaces in previously caries-free teeth, whereas a 62.1 per cent decrement was observed in the surfaces of teeth that were previously carious. The finding of greater effectiveness in previously carious teeth is similar to the observation with an aqueous solution of stannous fluoride applied topically to children's teeth.[3] In the study on topical applications, stannous fluoride resulted in a 97 per cent decrement in DMF surfaces in previously carious teeth and 52 per cent in DMF surfaces in previously caries-free teeth. When sodium fluoride was applied, the opposite effect occurred, that is, a lower degree of effectiveness was observed in previously carious teeth (28 per cent decrement) than in previously caries-free teeth (38 per cent decrement). This characteristic of topical sodium fluoride

3. Howell, C. L., and others. Effect of topically applied stannous fluoride on dental caries experience in children. J.A.D.A. 50:14 Jan. 1955.

treatment seems well established by several previous reports by independent workers.[4-8] Thus it appears that stannous fluoride was most effective in those situations where topically applied sodium fluoride appears to be less effective.

Columns 6, 7 and 8 in Table 1 show the caries increments by DMF surfaces divided into their various surface components: proximal, occlusal, buccal and lingual. The most pronounced effect was in the proximal surfaces, which showed an 83.7 per cent decrement. This decrease compares favorably with the 100 per cent decrement at the end of 6 months, or a difference in the estimate of effectiveness of only about 15 per cent. The decrement found at the end of one year in the occlusal surfaces is similar to that found at the end of six months, there being a 29.8 per cent decrement after one year and 25.8 per cent at six months. The greatest difference, as observed in the protection afforded the various surfaces by the stannous fluoride dentifrice, can be noted in a comparison between the six month and one year data in the buccal and lingual surfaces. After six months there was reported a 70.1 per cent reduction in caries rate in the buccal and lingual surfaces, while after a full year the children in Group 1 had only a 12.8 per cent decrement as compared with those in Group 2. An explanation for this is lacking at the present time.

That the stannous fluoride dentifrice was effective in reducing the initiation of new dental caries in teeth erupting during the one year study period is indicated by the data in Table 1, which shows that the children's teeth had a 37.9 per cent decrement in surfaces attacked in the stannous fluoride group. The fact that this figure is somewhat lower than the over-all decrement in DMF surfaces of 49.3 per cent may reflect the order in which the different tooth surfaces are attacked by caries. The occlusal surfaces of the most susceptible teeth are usually the first to decay, and it is these surfaces which showed a low decrement in this study.

Table 2 • Average increase in caries experience in DMF surfaces by age

Age in years	Group 1 Control		Group 2 SnF_2		Percentage decrement
	Number	Average	Number	Average	
6	18	2.33	17	1.65	29.2
7	45	2.11	42	1.09	48.3
8	44	1.45	43	1.37	5.5
9	18	2.56	22	0.73	71.5
10	10	1.50	19	1.11	26.0
11	16	5.31	14	1.93	63.7
12	11	4.45	16	1.81	59.3
13	15	5.27	15	2.73	48.1
14	20	5.20	13	1.77	66.0
15	12	4.25	13	2.85	33.0

Among the children in Group 1 there were a total of 66 reversals in diagnosis, whereas there were 178 in the children in Group 2. Again, this finding is reminiscent of the study of topical applications of sodium fluoride and stannous fluoride[8] in which there was a significantly greater number of reversals in diagnosis in the children treated with stannous fluoride than in either the control or sodium fluoride groups. It has been reported[9] that reversals in diagnosis are to be expected in any clinical dental caries study conducted in such a manner

4. Knutson, J. W., and Armstrong, W. D. Effect of topically applied sodium fluoride on dental caries experience. Pub. Health Rep. 58:1701 Nov. 19, 1943.

5. Knutson, J. W., and Armstrong, W. D. Effect of topically applied sodium fluoride on dental caries experience: report of findings for second study year. Pub. Health Rep. 60:1085 Sept. 14, 1945.

6. Knutson, J. W., and Armstrong, W. D. Effect of topically applied sodium fluoride on dental caries experience; report of findings for third study year. Pub. Health Rep. 61:1683 Nov. 22, 1946.

7. Knutson, J. W., Armstrong, W. D., and Feldman, F. M. Effect of topically applied sodium fluoride on dental caries experience; report of findings with two, four and six applications. Pub. Health Rep. 62:425 March 21, 1947.

8. Galagan, D. J., and Knutson, J. W. Effect of topically applied sodium fluoride on dental caries experience; experiments with sodium fluoride and calcium chloride; widely spaced applications; use of different solution concentrations. Pub. Health Rep. 63:1215 Sept. 17, 1948.

9. Radike, A. W., and Muhler, J. C. Effect of reversals in diagnosis on the interpretation of clinical dental caries tests. (Abst.) J. D. Res. 33:682 Oct. 1954.

that the initial and second examinations are completely independent of each other as they were in both of the studies in which stannous fluoride was used. It has been suggested[9] that where the experimental group has a greater proportion of reversals than the control group, this difference may be due in part to the arrest of incipient carious lesions.

Table 2 shows the number of subjects in each age group and the percentage decrement in caries rate at each age. There is no indication in these data of a relationship between age and the effect of the stannous fluoride dentifrice. Such a relationship was apparent in the data at the end of six months.[2]

SUMMARY

After 12 months of unsupervised use of a stannous fluoride dentifrice, a decrement of 51 per cent in DMF teeth and 49 per cent in total DMF surfaces was noted. The proximal surfaces were best protected from caries, showing an 84 per cent decrement, while the occlusal surfaces had a decrement of 30 per cent. The stannous fluoride dentifrice appeared to affect the teeth already decayed to a greater degree than previously carious-free teeth. The age of the subject apparently was not a major influence on the effectiveness of the stannous fluoride dentifrice.

The temporomandibular joint: upward force of the condyles on the cranium

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In 1910 and again in 1921, Alfred Gysi[1,2] contended that the mandible acted as a lever with the temporomandibular joint as the fulcrum. G. H. Wilson[3] as early as 1920 purported to show "with a true physical demonstration" that the muscular force on the mandible was "expended upon the bolus of food and not any portion of it upon the condyle." Gysi's contention survived until 1946, when Robinson[4] made a restatement of Wilson's theory. In trying to show conclusively that the temporomandibular joint "was not meant to bear heavy stresses," Robinson bolstered this old generalization for the dissenters by presenting his interpretation of some anatomical dissections and a diagram of forces. By 1949 this view had been widely adopted, and Moyers[5] thought that his electromyographic studies supported Robinson's conclusions.

Department of prosthetic dentistry, University of Otago Dental School, Dunedin, New Zealand.

1. Gysi, Alfred. Problem of articulation. D. Cosmos 52:1 Jan.; 52:148 Feb.; 52:268 March; 52:403 April 1910.

2. Gysi, Alfred. Studies on the leverage problem of the mandible. D. Digest 27:74 Feb.; 27:144 March; 27:203 April 1921.

3. Wilson, G. H. Manual of dental prosthetics, ed. 4. London, Henry Kimpton, 1920, p. 34.

4. Robinson, Marsh. Temporomandibular joint: theory of reflex controlled nonlever action of the mandible. J.A.D.A. 33:1260 Oct. 1946.

5. Moyers, R. E. Electromyographic analysis of certain muscles involved in temporomandibular movement. Am. J. Orthodont. 36:481 July 1950.

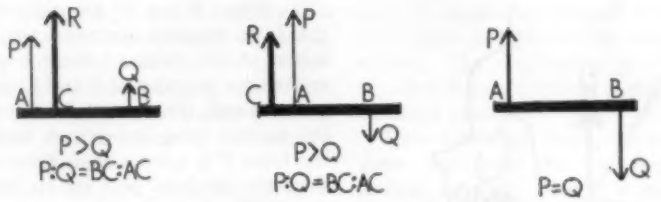

Fig. 1 • P,Q, forces applied to a rigid bar at A and B. Left: R, resultant of like forces P,Q. Center: R, resultant of unlike forces P,Q. Right: A couple; P and Q are equal

Gysi's proposition now seems to be in disfavor, and the concept of a nonlever articulation without a pressure-bearing joint has given rise to many "biological" theories.

In an endeavor to eliminate personal confusion, I proceeded "only from tangible premises which can be subjected to careful scrutiny."[6] The premises were drawn from statics and anatomy.

PREMISES FROM ANATOMY

The mandible can be described in static terms as a rigid body. For convenience in describing the direction of forces relative to the occlusal plane, the occlusal plane is taken as being horizontal. Any vertical force, therefore, will be at right angles to the occlusal plane.

The directions of muscular pull on the mandible are as follows:

1. The masseter muscle pulls forward and upward from its insertion on the external surface of the ramus. Its largest section[7] pulls in this direction; the other two tend to pull vertically.
2. The internal pterygoid muscle pulls upward parallel to the masseter muscle.
3. The temporal muscle pulls upward and backward at an angle of 50 to 60 degrees to the horizontal. The angle is not critical and will vary according to the action of the two or three bellies of the muscle.
4. The external pterygoid muscle pulls forward, slightly downward and toward the midline.
5. All other muscles attached to the mandible are either horizontally inclined or contribute only small forces during mastication.

PREMISES FROM MECHANICS

As the velocity and mass of the mandible and attachments are low, they will have little effect on the directions and magnitude of the forces during mastication. The following premises can be verified in any standard text on statics:

1. If two or more forces P,Q,S . . . act upon a rigid body, that is, one that is not flexible, a single force R may be found whose effect on the body is the same as that of the forces P,Q,S. . . . This single force R is called the resultant of the other forces P,Q,S . . . , which are called the components of R.
2. Any single force acting through a point may be resolved into two components acting through that point.
3. A force cannot produce any effect in a direction at right angles to its own line of action.
4. If two parallel forces P and Q act

6. Hartshorne, Charles, and Weiss, Paul, editors. Collected papers of Charles Santiago Sanders Peirce, vol. 5, Pragmatism and pragmaticism. Cambridge, Mass., Harvard Univ. Press, 1931-5.

7. Sprinz, Rudolph. Masseter muscle. Brit. D. J. 93:229 Nov. 4, 1952.

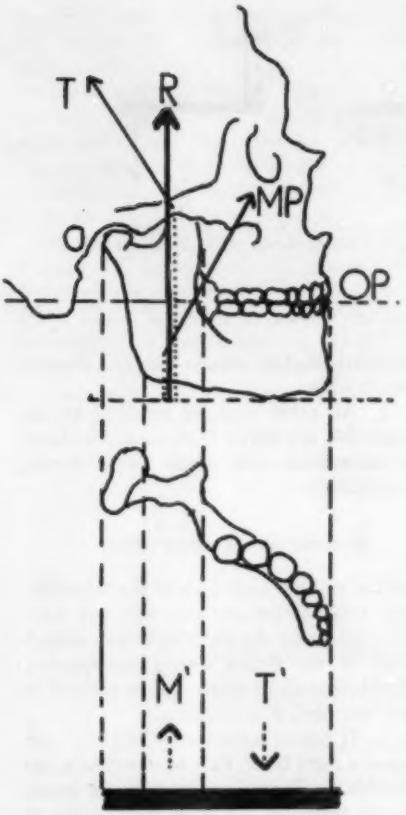

Fig. 2 • T, upward component of temporal muscle. MP, upward component of masseter muscle and internal pterygoid muscle. R, the vertical resultant of muscular force on each side. M' illustrates the muscle zone and T' the tooth zone

at points A and B on a rigid body, three possibilities exist:

a. When P and Q are like forces, that is, in the same direction, the resultant is a force whose line of action is parallel to the lines of action of the component forces and will pass through the rigid body between points A and B (Fig. 1, left).

b. When P and Q are unlike forces, that is, in opposite directions, the line of action of the resultant force is parallel to the lines of action of P and Q and will pass through the rigid body external to the portion lying between A and B. If the force P is greater than the force Q, then the resultant will be on BA produced (Fig. 1, center).

c. When forces P and Q are unlike forces of equal magnitude, there is no resultant; they are a couple (Fig. 1, right).

The point of application of the resultant at the point C on AB is such that the P.AC = Q.BC; that is, it divides the bar in the inverse ratio of the forces.

5. A single force and a couple acting in the same plane on a rigid body cannot produce equilibrium.

APPLICATION OF PREMISES

Vertical Resultant of All Muscular Forces on the Mandible • During the crushing or trituration of food, two main directions of force will be found, the backward and upward pull of the temporal muscle and the forward and upward pull from the masseter and internal pterygoid muscles. Because these are like forces, their resultant will lie between the points of application of the components, in this instance between the most anterior and most posterior attachments of the contributing muscles. The vertical muscular resultant could never be anterior to the anterior border of the ramus.

The resultant of the muscular forces on each side, therefore, will pass upward in the vicinity of the coronoid processes. The resultant of total muscular force on the mandible will lie between the coronoid processes in what will be called the muscle zone (Fig. 2).

Total Muscular Force and Food Resistance • During mastication, resistance from food will create downward forces on the mandible through the teeth. All these downward forces would give a

vertical resultant downward through a zone bounded by and including the teeth. The posterior limit of the "tooth zone" (Fig. 2) lies across the most distal portion of the last erupted tooth, which is seldom, if ever, posterior to the anterior border of the ramus.

A rigid body, the mandible, thus is acted on by two forces, muscular force and food resistance. The mandible may be considered in equilibrium, because the low mass and low velocity of the mandible will have little effect on our conclusions.

The lines of action of the vertical resultants of muscular action and food resistance cannot coincide, unless food is chewed on the rami.

Three possibilities, therefore, exist:

1. The total muscular force may be less than the food resistance. In order to obtain equilibrium, a force equal and opposite to the resultant of total muscular pull and food resistance must be present. This opposing force will act upward, anterior to food resistance. To obtain this opposing force from within the mandibular system (see Appendix), there must be an upward force and a downward force posterior to it, these forces being distinct from the two forces already resolved.

2. The total muscular force may equal the food resistance. A couple is then formed, and two equal and opposite forces will be required to obtain equilibrium. The upward force will be anterior to the downward force.

3. The total muscular force may be greater than the food resistance. The resultant will be a force upward and posterior to the muscle zone. For equilibrium there must be a downward force opposing the upward one.

Stabilizing Force • The first two possibilities in the foregoing list require an upward force on the mandible. Observation of the mandibular system will reveal the lack of significant upward forces other than those of the muscles already considered. The only other possibility demands a downward force posterior to the coronoid processes.

The stabilizing force, therefore, can come only from the area between or around the rami. Two sources are possible; these are the compression of the adjacent soft tissues and the temporomandibular joint. Compression of the adjacent soft tissues could supply only a very small force, so there must be a force caused by the joint, a force rising out of some structural effect. This is obviously the restraint in the temporomandibular joint on the movement of the condyle. The condyle is prevented from moving upward by the cranium or downward by the capsule of the joint. A force in the condyle must be opposed by another force, or the condyle will move. The restraint on the upward or downward movement of a condyle, thus, can be interpreted as being a possible downward or upward force, in opposition.

Observation of the mandibular system reveals, therefore, that the upward resultant of total muscular force and of food resistance must be opposed by the forces generated by the restraint on the vertical movements of the condyles within the temporomandibular joints. The vertical resultant of these "passive" forces must pass through some line through both condyles, must act downward and must be equal and coincident with the upward resultant of total muscular force and food resistance.

Three possibilities exist for the single line along which these two opposing forces must act: (1) it may lie outside the condyles, in which case the opposing forces on the condyles will be in opposite directions; (2) it may pass through one condyle, and the opposing force will act on that condyle alone or (3) it may pass between the condyles, and the opposing forces will act downward on both condyles.

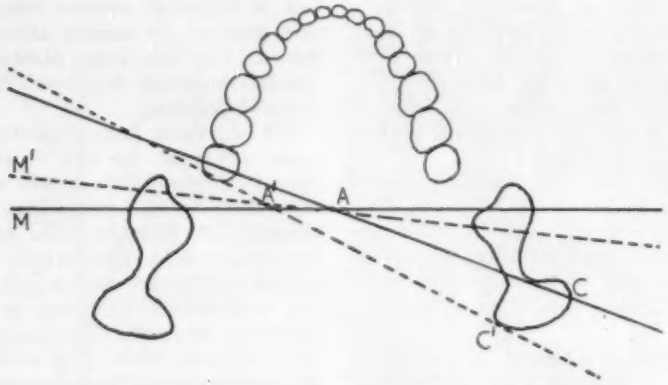

Fig. 3 • M, the line joining the muscular components. A, the point representing the vertical resultant of muscular force when the muscular components are equal and symmetrical. C,C', the most lateral and medial parts of the condyle. A', the estimated vertical muscular resultant on line M' joining the asymmetrical muscular components

GENERAL CONCLUSIONS

1. During mastication the resistance of the food to the upward muscular forces on the mandible will give an upward resultant force posterior to the coronoid processes.

2. This upward force may be interpreted as a tendency for the condyles to move.

3. Three possibilities exist: (1) one condyle may tend to move upward, the other downward; (2) one condyle alone may tend to move upward or (3) both condyles may tend to move upward.

4. The proposition has been proved, therefore, that one or both condyles tend to move vertically during mastication and, being restrained within the temporomandibular joint, will exert a force on the cranium.

DIRECTION OF VERTICAL FORCE IN THE TEMPOROMANDIBULAR JOINT

The extension that follows requires additional premises. Figure 3 shows the projection of the rami and the teeth on the occlusal plane. The vertical resultant of total muscular force will bisect the line (at A) joining its components, when the muscular pull is the same on both sides. The stabilizing force acts downward outside a condyle only when the vertical resultant of food resistance is posterior to a line CA joining the most lateral point of that condyle to the point representing the vertical line of action of the total muscular force.

Recent electromyographic studies,[5, 8, 9] however, seem to show that muscular pull on each side varies when food is between the buccal segments. On the working side as the mandible moves back toward the midline, the muscular force generated would seem to be greater than that of the other side. This means that the resultant of the total muscular pull will be closer to the working side. As the masseter muscle on the balancing side

8. Carlsöö, Sven. Nervous coordination and mechanical function of the mandibular elevators. Acta Odont. Scandinavica 10:Suppl. 11, 9, 1952.

9. Pruzansky, Samuel. Application of electromyography to dental research. J.A.D.A. 44:49 Jan. 1952.

does not seem to contribute as much force as its opposite, the vertical muscular resultant on the balancing side will move posteriorly, while on the working side anterior shift is possible. This move is enhanced by the greater force contributed by the internal pterygoid muscle on the balancing side, in comparison to the muscle on the working side. These effects are due to the positions of the attachments of the muscles, such as the internal pterygoid muscle to the angle of the jaw, rather than to an increased force.

Figure 3 illustrates the effects of both these changes: the vertical resultant of the forces of muscular pull and food resistance is limited to the area between the condyles.

The proposition, therefore, is that both condyles tend to move upward. The restraining forces on both condyles are in the same direction, although not necessarily equal.

SUMMARY OF PROPOSITIONS

It is shown, using premises from statics and anatomy, that the condyles tend to move during mastication. A further proposition suggests that they both tend to move upward.

DISCUSSION

There appears to be logic in the pattern of mandibular movements and muscle innervation. The system distributes the forces as evenly as possible between the condyles. The forward movement of the condyles, or the action of the external pterygoid and temporal muscles in positioning the condyles, is to ensure the controlled and close apposition of the condyles together with the shock absorbing disk to the articular eminence, through which the excess of muscular force required to overcome food resistance is discharged. Other anatomical considerations are beyond the scope of this discussion, except that it seems that the bone about the ramus and articular eminence is intended to transmit forces. The positions of some of the lines of forces from which the conclusions were drawn are aptly illustrated by Benninghoff's trajectories.

In the model from which Gysi[2] drew his conclusions, equal upward force was exerted at the same place on each side. This is not so in the living subject, according to electromyography. Some of Gysi's conclusions, therefore, can be doubted.

Wilson's[3] and Robinson's[4] concept of the so-called nonlever action is based on the assumption that the muscular force resultant passes conveniently through the first molar region. This assumption is fallacious and vitiates many of Robinson's conclusions.

The forces exerted through the condyles are not infinitesimal. If incision produces a reading of 30 pounds on a gnathodynamometer, the minimum force on each condyle will be 20 pounds. Similarly, 120 pounds in the buccal segments will give a force of 30 to 40 pounds on each condyle.

CONCLUSIONS

1. There can be upward forces from the condyles on the cranium during mastication. The temporomandibular joint, therefore, is pressure-bearing.

2. The nonlever concept of mastication is a fallacy.

3. The forces in the temporomandibular joints are distributed as evenly as possible by the innervation and action of the muscles of mastication.

APPENDIX

1. In order to prove that two unlike, unequal forces are required within the mandibular system to obtain a resultant outside the system, let R be the force required outside the system at point C.

a. Let any line through C pass

through the mandibular system at one point X only.

There is no force at X which can have a resultant at C unless C and X coincide; then R will be within the system.

b. Let any line through C pass through the system at any two points A and B.

The forces at A and C can be like or unlike.

(1) If the forces at A and C are unlike, then there is no force on CA produced which will with the force at A have a resultant at C in the same direction as R.

(2) If the forces at A and C are like forces, an unlike force on CA produced can with the force at A produce a resultant in the same direction as R. This will be only when the force at A is greater than this force on CA produced.

Only two unlike unequal forces within the mandibular system, therefore, can produce a resultant external to the system.

2. An additional reason why the total muscular force must be greater than food resistance is that the upward force of the mandible on the food, held stationary by the maxilla, generates the force of food resistance. Unless the upward force is greater than the downward force where food contacts the mandibular teeth, food will not be crushed. The upward force of the mandibular teeth is generated by the muscles. As the total muscular force resultant is greater than the upward force of the teeth (they do not coincide), and as the upward force of the teeth is greater than the food resistance, then the total muscular force is greater than the food resistance.

A method of measuring the adhesive characteristics of dental cement

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Much has been written about the adhesive characteristics of acrylic cements. Whether these cements are adhesive in the technical sense of possessing an "attractive force which causes unlike molecules to cling together"[1] or merely in the sense of possessing "the ability to stick together substances in contact with each other"[2] is uncertain. In this report the term adhesion is used in the latter sense.

Although the exact mechanism by which acrylic cements adhere to tooth surfaces is unknown, the adhesive properties of such materials are highly desirable. If a cement adheres well both to

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1. Foley, Arthur Lee. College physics, ed. 2. Philadelphia, Blakiston Co., 1937, p. 159.

2. Webster's new collegiate dictionary, ed. 2. Springfield, Mass., G. & C. Merriam Co., 1953, p. 11.

gold and to tooth structure and if the adhesion is not greatly affected by changes in temperature or humidity, then there should be only a minimum amount of leakage when this material is used for the cementation of inlays, bridges and so forth. Adhesion should also tend to minimize the practical effect of shrinkage of the resin during polymerization.

There is no specific test for adhesion. Earlier tests for adaptation generally involved the study of the penetration of organic dyes or the resistance to air pressures.[3] Christie[4] measured the adhesion of direct filling resins to a number of substances. Recently two reports in the foreign literature described methods of measuring the amount of force required to break the bond between the filling material and the tooth surface.[5,6] These technics have certain limitations, however, and were designed primarily for studying restorative materials rather than dental cements.

The primary purpose of this investigation was to devise a workable and accurate laboratory method of testing the adhesive properties of dental cements. A test of this type should be valuable for evaluating various cements and for studying the effect of certain manipulative variables involved in the use of these materials.

PROCEDURE

Various test methods were studied and employed before a final technic, a test for determining tensile strength, was selected. This test measured the adhesive characteristics of a cementing material which was placed between gold and dentin surfaces. The component parts of the stainless steel apparatus can be seen in the upper part of the illustration. The jig was machined so that the diameters of all parts were uniform and in centric relation. A cast gold post, f, 3/16 inch in diameter, was threaded to screw into g. The crown of an extracted tooth was ground flat in order to prepare a disk of dentin, e, which fitted into d. The section was undercut and secured to the metal by means of a fast-curing resin filling material. This part screwed into c, whose outside diameter was the same as that of g, so that these pieces could be placed in a V-block and held in alignment.

A micrometer was clamped above the V-block in such a manner that the gold plug could be brought into contact with the dentin surface merely by closing the micrometer. To assure that a uniform force was maintained on the test specimens during the setting of the cement, one minute after the start of the mix the assembly was placed under the ratchet pressure of the micrometer and held for four minutes. The time at which pressure was first applied was controlled carefully, since previous research had indicated considerable variation in adhesion when the material was in different stages of polymerization.[5] Another advantage of employing the micrometer as a means of holding the specimens in position was that by measuring the specimen before and after cementation it was possible to determine the approximate film thickness of the material.

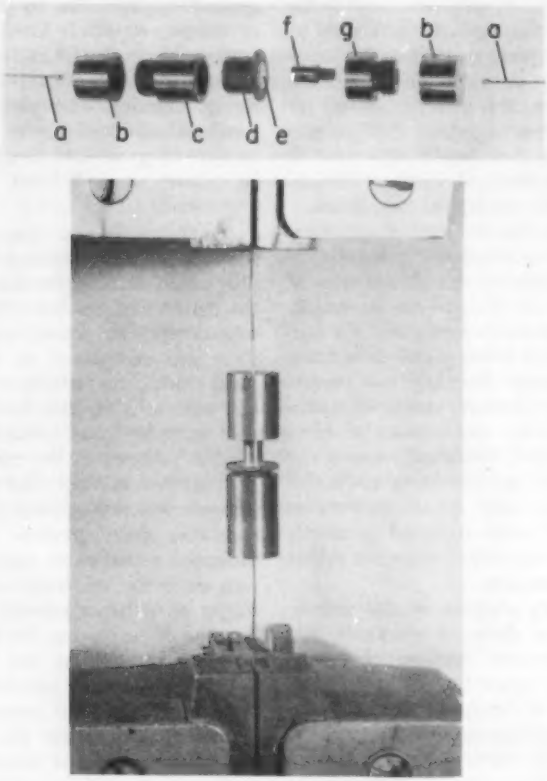
The pressure of the micrometer forced the excess cement away from the margins. The amount of cement used was controlled to minimize the excess. To determine the influence of this slightly overhanging cement on the adhesive characteristics, a series of tests was made in which the excess was allowed to remain on one group of specimens but was

3. Fiasconaro, Joseph, and Sherman, Harold. Sealing properties of acrylics. New York D. J. 18:189 May 1952.

4. Christie, D. R. Acrylic fillings—general comments and some experimental data. J. Canad. D. A. 17:427 Aug. 1951.

5. Stüben, J., and Lockowandt, P. Experimentelle Untersuchungen über die Haftintensität des schnellhärtenden Kunststoffs. Zahnärztliche Welt 7:298 July 25, 1952.

6. Bertram, Elsbeth. Measurement of the adhesion of fast curing acrylics to dentin and phosphate cement. Inaugural dissertation, Göttingen University, Germany.



Tensile testing machine. Above: a-d and g, component parts of assembly used to measure adhesive characteristics of dental cement. Gold plug, f, is cemented to dentin surface, e. Below: Assembly in testing machine. Tensile strength is measured by force required to pull cemented gold plug from dentin surface

carefully removed from others. No difference was detected; therefore, the excess was left untouched on all specimens.

Parts b were merely metal caps with small holes through which steel wires, a, could be inserted. By placing these caps, with the wires attached, in the grips of the tensile testing machine, shown in the lower part of the illustration, it was possible to measure the amount of force required to break the bond between the gold and the tooth structure. A Tinius Olsen testing machine was used, and the capacity was set for a maximum load of 100 pounds. The rate of loading was 576 pounds per square inch per minute.

The dentin disks were prepared from freshly extracted molar teeth which had been stored in tap water immediately after extraction. The disks were sectioned at right angles to the occlusal surface, ground flat under water and shaped to fit the jig. After the dentin had been mounted, it was carefully surfaced by

Table • Tensile strength of dental cements after storage in air, 100 per cent humidity and tap water

Storage medium	Zinc phosphate 1 hr. strength*	Zinc phosphate 16 hr. strength*	Acrylic resin 1 hr. strength*	Acrylic resin 16 hr. strength*
Air	200	0	1,300	1,200
100% humidity	200	0	1,300	400
Water	100	0	400	0

*Strength in pounds per square inch.

means of the airbrasive machine with the cutting abrasive. This technic assured a uniform surface. The tooth specimens, however, were checked repeatedly for signs of chipping, cracking or any irregularities that might introduce error. The teeth were replaced frequently. Only the one type of surface preparation was employed in this study. To minimize the influence of variations in the moisture content of the dentin before cementation, the tooth surface was wiped with acetone, dried with air and again wiped with acetone.

Many tests were made in the manner described, in which the relative adhesiveness of cementing materials was compared and such variables as temperature and moisture were introduced. These tests proved that this technic was a workable method of measuring the adhesive characteristics of acrylic cements. To demonstrate the type of data which can be obtained by the test, measurements were made on two representative products, one a zinc phosphate cement and the other an acrylic resin cement. The materials were handled in accordance with the manufacturer's directions, and the same batch was used throughout.

To determine the importance of maintaining an exact powder-liquid ratio for the resin cement, a series of tests was made in which the ratio was varied considerably. No difference was detected in the adhesive qualities of relatively thick and thin mixes. These results corroborate the work of Bartram.[6] It was unnecessary, therefore, to control this variable for the resin cement. The mixes were merely prepared to the same visual consistency and in accordance with the recommendation of the manufacturer.

It is recognized that this test does not necessarily conform to the type of stress to which an inlay is subjected in the mouth, but it does provide a suitable method for studying the adhesion of various materials to tooth structure.

RESULTS

Storage Environment • The relative adhesiveness of the cements was measured after the cements were stored in air, in approximately 100 per cent humidity and in tap water. The specimens were tested for tensile strength 1 hour and 16 hours from the time the mix was started. The specimens stored in 100 per cent humidity and in tap water were allowed to stand in air for ten minutes before being placed in a humidor.

The results appear in the table. The values represent an average of at least 20 specimens for each series. After one hour storage in air, the tensile strength of the specimens cemented by acrylic resin was approximately six times as great as that of specimens cemented by zinc phosphate. These results compare closely with the data obtained by Stüben and Lockowandt,[5] who found that the adhesion of self-curing acrylic cements to dentin was 5 to 11 times as great as that of the zinc phosphate cements. Sixteen hours storage in air did not increase the adhesiveness of the acrylic resin ce-

ment. Bartram[6] noted that self-curing acrylic filling materials seemed to reach maximum adhesion at this time.

One hour storage in 100 per cent humidity did not affect the adhesive properties of the zinc phosphate cement, but storage in tap water did. At the end of 16 hours, all specimens cemented with zinc phosphate cement, whether allowed to remain in air, 100 per cent humidity or tap water, broke before the test could be carried out. Some of the specimens separated during the storage period, while the remainder broke during placement in the tensile testing machine.

The deleterious effects induced by moisture on the resin cement are shown by the data in the table. The force required to break the bond of specimens which had been stored in 100 per cent humidity for 16 hours was 66 per cent less than that required to break the bond of those which remained in air. When the specimens were stored in tap water, they reacted as did the zinc phosphate cement, breaking before an initial reading could be taken. These results resemble those of Stüben and Lockowandt,[5] who noted a decrease of 65 per cent in the strength of one resin which they tested after it had been stored one hour in water; the results after 12 hours storage were similar. In a recent study Rose[7] made comparable observations.

It is apparent from these data that resin has superior adhesive properties on a dry dentin surface but that this adhesiveness is greatly reduced when the specimen is subjected to moisture.

Thermal Change • The high coefficient of expansion of acrylic resin is another factor which may influence its clinical behavior as a cementing material.[8] Changes in temperature within the oral cavity possibly could reduce any adhesion that was present originally and permit an ingress of saliva and bacteria at the margins. Since moisture rapidly dissipates the adhesion of both zinc phosphate and resin to dentin, the additional loss in adhesion due to fluctuations in temperature might be difficult to determine and would be of little practical significance. If specimens immersed in water were subjected to a cycle of temperature changes, there would be little indication as to whether the loss in adhesion was influenced by the coefficient of expansion of the material. The isolation of the effect of temperature change from the effect of moisture is not of great importance with the present materials. If a material should be developed, however, which would be adhesive even when subjected to moisture, then any reduction in adhesion due to temperature change would be significant. Therefore, the effect of temperature change on acrylic and zinc phosphate cements was tested.

The test specimens were kept in desiccators during the experiment to eliminate completely the variable of moisture. Two temperature extremes were used, one desiccator being placed in an oven held at 80°C., while the other was packed in ice. The desiccators were placed in their respective atmospheres before the test was begun so that the air within might reach the proper temperature.

Test specimens were placed in the desiccator in the oven for 15 minutes. This period of time was sufficient to allow the specimens to reach the same temperature as the desiccator. The specimens were then quickly transferred to the cold desiccator and held for 15 minutes. They were then carried back to the oven. This process was continued until the specimens had been introduced to the atmosphere of the oven 20 times and to the cold desiccator an equal

7. Rose, E. E., and others. The screening of materials for adhesion to human tooth structure. Paper read at the 32nd general meeting of the International Association for Dental Research, French Lick, Indiana, March 21, 1954.

8. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

number of times, with the result that there was a total of 39 temperature changes. The specimens were then placed in the tensile testing machine and broken.

The average force required to break a series of 20 resin specimens was 1,300 pounds per square inch. This measurement compares closely with the measurements made when the cement was stored in air at a constant room temperature. It is evident that the dimensional changes induced by the limited number of cycles employed in this study did not affect the adhesiveness of the acrylic cements. If these tests had been continued further, however, loss in adhesiveness might have been noted.

These tests do not prove that the adhesion of acrylic cements to dentin is not influenced by temperature change in the mouth where moisture is present. These are merely preliminary data, and steps were taken to isolate the variable of moisture from the dimensional change induced by the high thermal coefficient of expansion of the resin. Further tests of this nature seem warranted.

Tests made in the same manner with zinc phosphate cement proved inconclusive because of the effect of desiccation on the material.

DISCUSSION

These experiments have been presented to demonstrate the use of this test in measuring the relative adhesive qualities of certain dental cements. The authors are cognizant of frailties in the test. The use of dentin is undoubtedly a source of uncontrollable error. Attempts were made to reduce this variable as much as possible by the standardization of the preparation of the dentin disk, but undoubtedly inherent differences were present. Although a metallic surface would eliminate many of these variables, results on such a surface might be completely different from the behavior on actual tooth structure. For this reason and others, the need for testing a large number of samples must be emphasized.

Results from an experiment on a small group can be misleading. This fact is illustrated by the mean deviation which was calculated on 20 specimens cemented with the resin cement and stored in air for one hour. The mean deviation for this group was 619 pounds per square inch. Although there was considerable variation in individual specimens, the investigators found consistent average values when these values were computed on the basis of at least 20 specimens. Results can readily be duplicated by using the mean strength of a sufficiently large group. This observation has been corroborated by others.[9, 10]

It is difficult to predict the clinical significance of these results, and no attempt will be made at this time, as this was an *in vitro* study. The adhesion of these materials to enamel may be different and possibly of greater importance. The effect of liners to increase adhesion also needs careful study. Before definite conclusions can be reached, the tests now in progress must be completed and correlated with clinical observations.

SUMMARY

A laboratory method of testing the adhesive properties of dental cements has been devised. These tests demonstrated greater adhesive characteristics for resin cements than for zinc phosphate cements on a prepared dry dentin surface. The effects induced by the exposure to moisture of both resin cements and zinc phosphate cements were deleterious.

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9. Rose, E. E. Personal communication.
10. Wileman, W. R. Personal communication.

A rationale for reconstruction

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The goal of oral reconstruction is the re-establishment of the biological norm. The difficulty lies in the interpretation of what is normal. The dental apparatus can survive the lifetime of man, but it usually fails to do so. Attempts to find the key to dental longevity have given rise to observations on occlusion which have crystallized into pat definitions, such as that of Angle, based on "Old Glory,"[1] and that of McCollum, predicated on the condylar position.[2]

There are occlusions which satisfy the definitions of normalcy but which do not function satisfactorily. Likewise there are occlusions which do not meet the conditions of the definitions and yet function satisfactorily. Regardless of definitions, normal occlusion, or rather good occlusion, is one which will not destroy itself during the lifetime of man but will tend to stimulate and strengthen itself, regardless of the rigors of function. In reconstruction, the practitioner must attempt to establish that form and function which will last for the lifetime of the patient.

In attacking the problems of malocclusion and malfunction, the practitioner begins with rest position, the immutable, constant heritage of man. If the practitioner has given the patient a freeway space of approximately 2-4, 3-5 or perhaps even 1-9 mm. and an accepted occlusal pattern, then he believes that he has reconstructed the occlusion. All too often, however, the reconstructed dentition fails miserably in function for the simple reason that the practitioner does not understand the basic concepts of rest position and freeway space.

FACTORS AFFECTING REST POSITION

There are various imponderables that make up the so-called rest position.

Tonus · In order to rest, a muscle must have comparatively few fibers in contraction at any one time. The burden of contraction is passed from fiber to fiber so that all may enjoy rest and relaxation. This lower neuron reflex, however, is controlled by higher cranial activities such as thought and emotion. Therefore, the muscle is not in the same state of rest at all times.

The practitioner cannot know what the patient's mental state is when he comes for treatment. The dentist cannot force the patient to assume the proper rest position for recording that position and for determining the freeway space merely by telling that patient to relax. The patient is supposedly in a state of complete rest during sleep; yet an ever-increasing number of bite-plates are being made to combat the devastating effects of nocturnal bruxism, which occurs during sleep.

1. Angle, Edward H. Treatment of malocclusion of the teeth, ed. 7. Philadelphia, S. S. White Dental Mfg. Co., 1907.

2. McCollum, B. B. Fundamentals involved in prescribing restorative remedies. D. Items Interest 61:522 June; 641 July; 724 Aug.; 852 Sept.; 942 Oct. 1939.

Indeed, the success or failure of a restoration may depend, at least in part, on the mental state of the patient at the time of the registration of rest position. Figure 1 shows two restorations, one of a calm patient, which was reasonably successful and the other of a nervous patient, which was only partially successful. In the case of the nervous patient, a habitual worrier, only the occlusal restoration was accomplished; the vertical dimension could not be restored. No attempt was made to reposition the mandible. In the case of the calm patient, however, the mandible was repositioned more anteriorly, the vertical dimension was restored, and no further loss of bone occurred.

Gravity • Gravitational forces applied to the mandible at rest affect its relation to the skull.[3] Practitioners of one school of thought[3] would use the registration of the position of the condyle when the body is in the supine position as a key to normal occlusion. Yet the attachment of ponderous recording devices to the mandible would increase the gravitational load on the mandible and further displace it distally.[4] The body and head are inclined toward the prone position at mealtime when man's jaws function vigorously.

If centric and rest positions are on the same arc of closure, as maintained by the hinge-axis school, then it is hard to understand how the arc can be deter-

3. Schweitzer, J. M. Oral rehabilitation. St. Louis, C. V. Mosby Co., 1951, p. 514.
4. Sarnat, B. G., editor. The temporomandibular joint. Springfield, Ill., Charles C Thomas, 1951, p. 29.

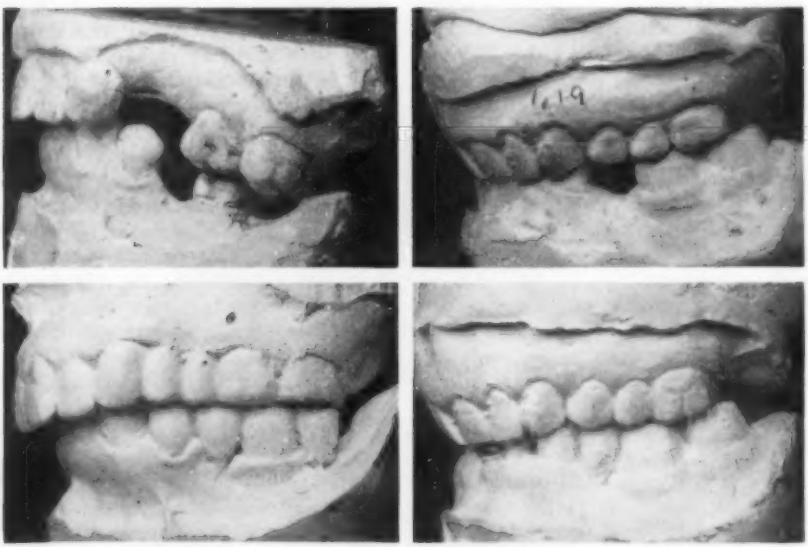

Fig. 1 • Two restorations, one successful and one only partially successful, for patients with undersized mandibles, loss of vertical dimension, closure and loss of posterior support. Left above: Pretreatment model of extremely nervous patient, a habitual worrier. Right above: Pretreatment model of successful business executive with a calm disposition. Left below: Model of nervous patient six years later. Right: Model of calm patient five years later

Fig. 2 • Overclosure and distal displacement of mandible. Left: At occlusion. Fanning of upper anterior teeth is caused by overclosure. Right: At "rest" position. Anterior position of mandible compensates for protrusion of upper anterior teeth

mined if the rest position deviates so readily under gravitational influence.

Spasm • It must be realized that reconstructive procedures are not performed for healthy dentitions but rather for those which are becoming progressively worse. It would be unwise to assume that muscular tonicity is not affected by the increasing malposition and malfunction of the collapsing dentition.

In the simplest and probably most common type of malocclusion, the patient suffers early loss of molar support with subsequent tipping of adjacent teeth, loss of mandibulomaxillary dimension, fanning of the upper anterior teeth, and distal displacement of the condyle as a result of incorrect incisal guidance and extrusion of posterior teeth. Pain and clicking may occur in and about the temporomandibular joint.

The external pterygoid muscle is attached by two heads to the mandible. The upper head fuses with the meniscus via the capsule; the lower head attaches to the anterior surface of the neck of the condyloid process. The mandibular elevators, masseter, temporalis and internal pterygoid muscles, easily override the external pterygoid muscle and cause it to stretch through its lower attachment as the mandible is overclosed and driven distally.

The external pterygoid muscle may react with spasticity of varying degrees as it is stretched in closure of the jaws and may tend to pull the disk forward by its superior head. The result is that the disk is displaced anteriorly as the elevator muscles drive the condyle distally and the mandible is guided in that direction by the abnormal incisal guidance. The click and pain are felt as the condyle disarticulates from the disk distally and may give rise to intracapsular edema, which in turn may lead to arthritic degeneration and fibrosis of the joint.

In such a condition, it is extremely doubtful that an accurate rest position can be determined, since the external pterygoid muscle cannot relax while it is constantly being forced to stretch and thus the so-called "perfect balance of muscular forces at rest position" cannot be achieved.

Habit • Malocclusion may give rise to compensatory habits and vice versa. The effect of malocclusion on habit is illus-

trated in the following case (Fig. 2). A woman patient, approximately 35 years of age, had lost her molars at an early age. Within the past ten years, fanning of the upper anterior teeth was noted, and the joints became sore and clicked. For cosmetic reasons, the jaw was held in a protruded rest position to hide the fanning. When the jaw was forced distally to a more "normal" rest position, the patient complained that she could not make her lips touch, her oral tissues felt dry, and she thought she "looked silly."

The vertical dimension was restored by means of temporary splints; the upper anterior teeth were extracted and replaced with a prosthesis in a more natural position. Within two weeks, the joint symptoms disappeared, and the patient slowly accustomed herself to maintaining her mandible in a more distal position at rest. It would have been fairly impossible for this patient to assume a normal centric relation and rest position with the natural dentition unmodified.

Disease • Another factor which often disrupts good occlusion is disease, especially a disease which is neuromuscular in nature. An error in the evaluation of the cause of malocclusion was made in the following case. The patient, a man 45 years of age, had a mandibular deviation to the left with intrusion of the bicuspids on that side (Fig. 3, above). The patient stated that he was an inveterate pipe smoker and that he clenched the stem of the pipe on the left side between the jaws. According to the diagnosis based on these facts, the habit was the direct cause of the intrusion of the bicuspids and the extrusion of the right molar and the indirect cause of the mandibular deviation, which resulted both from the habit and from the extrusion of the right molar. The occlusion was restored and the deviation corrected (Fig. 3, below left).

The recall examination six months later revealed extremely good bone and soft tissue; the patient was well pleased. The pipe habit had been discontinued.

Fig. 3 • Above: Deviation of mandible and intrusion of left bicuspids, supposedly caused by pipe habit. Below left: Deviation and intrusion apparently corrected by treatment. Below right: Deviation of mandible to left again six months after treatment

The mandible, however, had again deviated to the left (Fig. 3, below right). Further questioning elicited the additional information that the patient had had poliomyelitis as a child. The musculature and skeletal structure of the left thorax and arm were slightly atrophied. It was then realized that the muscles of mastication had probably been affected similarly, especially the left external pterygoid muscle. The unequal pull of the external pterygoid muscles on either side had resulted in a deviation to the afflicted side. Fortunately, no interferences were ascertained in the deviated position, and it was decided that it was not necessary to remake the dentition. The relative importance of the pipe habit and the disease as causative factors could not be determined, though surely both factors were important.

Jaw Size • The developmental pattern of a normal adult is dependent to a great extent on the harmonious interrelationship of various independent growth centers. In the functioning of the teeth, the craniomandibular relations are of primary importance. As the face and upper jaw develop around the sphenoidal center, the mandible, too, must develop proportionately through growth of the condyle, the angles and the alveolus. The product in the normal person is a harmony of proportions between the face and the mandible.

In some persons, however, environmental and hereditary factors intervene and cause a disproportion in size and positional relations. Because of the great number of growth centers, the possibilities of variation are infinite, not only in the relations of the mandible to the maxilla but also in the relations of bones, or portions of bones, to each other. Disproportionate relation of the size of the cranium to the size of the mandible does not necessarily lead to poor occlusion, but merely to different or atypical occlusion. As long as the relation does not lead to breakdown of occlusion, pain or malfunction, the occlusion can be considered good occlusion.

Malocclusions must be evaluated individually and not classified simply as arising from oversized or undersized mandibles. Often orthodontists can correct and correlate the growth rates of the various centers. The dentist seeking to reconstruct the dentition of an adult can only modify the occlusal pattern and at times reposition the parts; he cannot alter their size or shape. The aim of the reconstructionist is, if possible, to produce a harmonious relation of the parts as they have already developed. A case can be called a complete success when the integration of the parts causes a cessation of occlusal destruction. A case is partially successful if the rate of destruction has been retarded.

From observation it appears that persons with too small a mandible usually have poor occlusion of teeth and frequently pain and clicking in the temporomandibular joint, due perhaps to the peculiar structural imbalance in this type of jaw relation.

Each of the various types of mandibles has characteristic paths of movement in closure from rest to centric occlusion.[5] In a majority of cases (65 per cent) when the mandible is too small, there is a very low anterior placement of the condyle in the fossa at rest position, and in the final closure to centric occlusion the musculature translates the condyle to a considerable degree. The condyle in such a case is subject to the violence of the muscular forces and may be seriously displaced.

Any malfunction in muscle action due to such factors as occlusal disharmony, trauma and psychic disturbance may easily lead to joint disturbance with attending symptoms. Furthermore, in an

5. Ricketts, R. M. Laminography in the diagnosis of temporomandibular joint disorders. J.A.D.A. 46:620 June 1953.

undersized mandible, the teeth are usually crowded, the alveolar bone is fragile, and gingival tone is poor—all these factors produce the environment which leads to carious and periodontal involvement and subsequent early loss of teeth. This is the type of jaw in which the greatest difficulties are encountered in reconstruction.

Attempts to evaluate a centric relation by means of hinge axis records on undersized mandibles may often lead to an aggravated malposition because of the extreme degree of translation in closure. The teeth remaining in the arch are usually not well supported by alveolar bone and might easily give way under the load of a prosthesis improperly applied. There is a strong temptation to position the mandible in an anterior relation for better occlusal relation and esthetics; but if this position is established, then the condylar position is thereby further jeopardized, often the condyle will be retruded, and the dentition will be destroyed.

RECORDING THE RELATIONSHIP

Recognition of the interdependence of condylar movement, muscle forces and vectors, and occlusal pattern almost invariably leads to the realization that so-called anatomical articulators must be used in reconstructive procedures. Because of the flaw in the basic design of most articulators,[2,6] however, attempts to correlate articulator and human movements may lead to considerable error, as can be seen from a study of the articulators commonly employed, for instance, the Hanau, Gysi and House articulators.

The condylar shaft on the articulator representing the human condyle is mounted to the upper frame of the articulator; the slots on the machines representing the inclination of the articular eminence are mounted to the lower frame. This condition is directly opposite to that in the human being. The distance from the condyle to the lower incisor teeth in the human being always remains constant, regardless of the mandibular position. In eccentric protrusive or lateral movement of the articulator, the distance between the condylar shaft or axis and the lower incisor teeth is increased; the arc of closure in the sagittal plane will be different on the machine from that of the human being.

Even though the casts are mounted by maxillary or mandibular face bows to the articulator, the hinge component of closure in eccentric position will be in error (Fig. 4, left). Thus if wax bite records of protrusive and lateral movements are obtained without occlusal contact and if final closure to occlusal contact is made on the articulator, the path of closure on the articulator will be on a longer condyloincisal radius, and the contact position of the casts will be false.

Attempts to create a so-called balanced occlusion in all excursions may lead to premature contacts on the balancing side, a condition which is difficult to detect in the mouth. This factor alone may often lead to breakdown of the reconstructed occlusion because of almost purely horizontal stresses imposed on the balancing side.[7]

Bergstrom[6] and McCollum[2] have minimized this error considerably in the basic design of their instruments by reversing the position of the condylar components on their respective articulators, the Arcon and the Gnathograph. The "balancer" articulator, advocated by Tinker[8] and used by those who believe that occlusal pattern is the chief determinant of condylar pathway and muscle movement, avoids the error of changing condylo-

6. Bergstrom, Gunnar. On the reproduction of dental articulation by means of articulators; a kinematic investigation. (Acta Odontologica Scandinavica, Suppl. 4.) Orebro, Sweden, A-B. Litforin Ryden, 1950.

7. Schuyler, C. H. Factors of occlusion applicable to restorative dentistry. J. Pros. Den. 3:772 Nov. 1953.

8. Tinker, Edward T. Predetermination of occlusal surfaces of the teeth involved in dental restorations. J.A.D.A. 18:1046 June 1931.

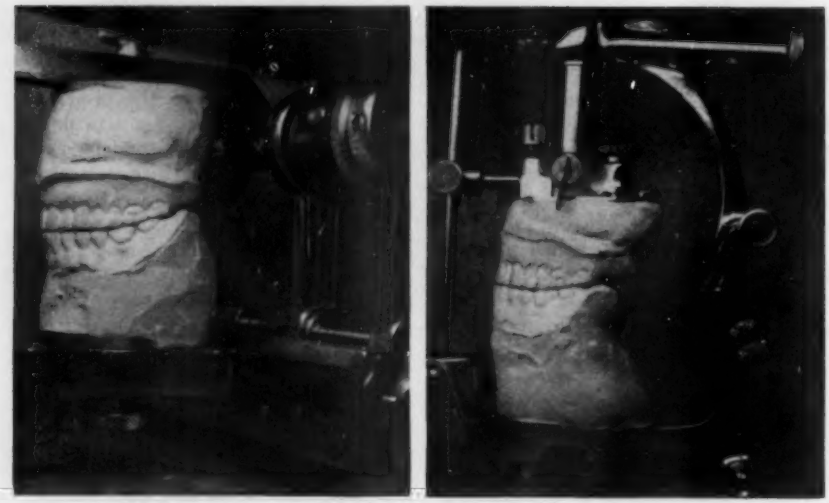

Fig. 4 • Left: Common articulator. Distal displacement of condylar element in protrusive excursion increases condyloincisal distance, which acts as radius for arc of closure in protrusive relation. With change in radius, arc of closure differs from that of human being. Right: "Balancer" articulator. There is no increase of condyloincisal distance in protrusive relation on this articulator because protrusive relation (retrusion of upper cast) movement is made by the ball and socket joint that is located above the casts. The hinge component of this eccentric movement is the same as it is in the human being, but there is no provision made here for variability of the condylar path

incisal distance in eccentric movement in the sagittal plane (Fig. 4, right).

It is not the purpose of this paper to analyze the validity of various articulator concepts; however, it must be borne in mind that since the interdependence of condyle, muscle and tooth is established, any articulator technic, such as that of Tinker, which disregards approximately two thirds of the problems involved in reconstruction may easily lead to failure.

CONCLUSION

There is no simple key to the problem of reconstruction and repositioning. A malfunctioning and mutilated dentition cannot be readjusted according to preconceived ideas of normalcy. The normal is not a crystallized concept capable of definition; it is rather a condition existing throughout life and is capable of change.[9,10] In repositioning and alteration of vertical dimension, temporary splinting without cuspal interdigitation or cuspal inclines should be employed to relieve spasm, to destroy improper habit patterns and to permit the individual to find a position which is peculiar to him, natural and satisfactory.

701 West 175 Street

9. Begg, J. R. The relationship of orthodontics to general practice. Am. J. Orthodont. & Oral Surg. 31: 507 Oct. 1945.

10. Friel, Sheldon, Occlusion, observations on its development from infancy to old age. Internat. J. Orthodont. 13:322 April 1927.

Role of the dentist in the detection of nondental disease

Edward R. Pinckney, M.D., M.P.H., Napa, Calif.

The detection of unrecognized illness, whether overt or in the incipient stage, may be considered one of the most essential services of a public health program.[1] Education in the methods and the importance of detection of disease for all persons concerned either directly or indirectly with health work, therefore, is a prime purpose of any health worker.

Some examples of methods used in public health work for the detection of disease are as follows: (1) screening tests, including those for certain cancer and heart conditions, defects of vision and hearing, and specific diseases, such as tuberculosis, syphilis and diabetes; (2) periodic physical examinations; (3) requiring authorized persons to report certain communicable diseases and (4) birth and death certificates. The latter two methods have not proved to be of as great value as is thought. The dentist, however, can help in the detection of nondental diseases by screening tests and periodic physical examinations.

In any public health program, whether it be governmental or privately sponsored, the cost of operating must always be balanced against the supposed beneficial results. Any program which would improve the detection of nondental disease by dentists and which would cost only a few minutes' time for each dentist should be accepted readily. At the present time, unfortunately, the procedure which might be one of the most productive is the least utilized. This procedure requires the physician or dentist to emphasize the care and preservation of normal health and to search for undetected disease in its early stages.

The average general practitioner of medicine spends only 5 per cent of his time making routine physical examinations.[2] The remaining 95 per cent of the physician's time is devoted to positive physical observations of overt or supposed illness. The physician usually is not consulted until actual illness is evident.

The situation with regard to the dentist is quite different. Because dental diseases usually do not keep individuals from the performance of their daily routine duties, the dentist sees far more "well" persons in a medical environment than does any other person in the health field. The term "well" is used to mean those not overtly ill. The fact that many times the dentist is the first person in a position to see certain pathologic

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1. Maxcy, Kenneth F., editor. Rosenau's Preventive medicine and hygiene, ed. 7. New York, Appleton-Century-Crofts, Inc., 1951.

2. President's Commission on the Health Needs of the Nation. America's health status, needs and resources. In Building America's health, vol. 2, 1951.

changes,[2] and the regularity of visits by dental patients[4] make the dentist an important detector of certain conditions which show in the tongue, lips and several square inches of mucosa in the oral cavity,[3] along with the teeth, gums and adjoining bone structure. The dentist should also be able to recognize skin lesions, growths and other abnormal conditions of the face, hair, neck and adjacent areas.

What conditions are of public health importance, and more specifically, which of these would be most significant to the dentist? Under the present concept of public health and its services there is no condition that has any effect on the physical, mental and social well-being of people, whether individually or as a community, which does not concern those in health work. The dentist is under a moral obligation[3] to participate in a program to aid in the detection of disease, and thereby to protect the community from communicable diseases. By the dentist's recognition of conditions which might be transmitted during the course of his work either to him or by him, he protects himself as well as others.

Some diseases which might be readily detected by a dentist while performing his usual treatments include the following, which are not listed in order of their importance:

1. Cancer and other growths in all forms
2. Syphilis in all stages and especially congenital syphilis
3. Tuberculosis
4. Diabetes and other metabolic and glandular conditions
5. Blood dyscrasias, such as anemia
6. Avitaminosis and other nutritional deficiencies
7. Conditions reflected by unusual dyspnea, such as cardiac disease
8. Heavy metal intoxications
9. Pathologic conditions or defects of the eye and ear
10. Bacterial, mycotic, viral and parasitic diseases, as well as some of those of unknown origin

A study[5] was made of the number and type of nondental diseases noticed by approximately 350 active members of the Alameda County Dental Society, California. Ninety-eight dentists responded to the questionnaire. The diseases most commonly suspected by these dentists are listed in order of their frequency. The number of dentists suspecting each condition is shown.

1. Cancer, 37
2. Diabetes, 20
3. Sinusitis, 20
4. Vitamin deficiency, 16
5. Tonsillitis, 12
6. Anemia, 12
7. Mumps, 9
8. Thyroid conditions, 9
9. Cardiac diseases, 7
10. Leukoplakia, 7
11. Mental conditions, 5

Fifty other diseases were mentioned singly.

The number of dentists who were detecting nondental diseases and referring the patients involved to a physician during a four and one-half month period, including 100 working days, was also studied.[5] Of the 98 dentists replying to the questionnaire, 78 had referred 840 patients with suspected disease to a physician, whereas 20 dentists did not refer a single patient. The greatest number referred by any dentist was 100. The average number of patients seen per day was 13; the most usual number was 10. There was not much difference between the number of patients referred to a physician by the dentist who treated 6 pa-

3. Hirschfeld, Isador. Dentist's role in the detection and prevention of systemic disease. J. D. Med. 7:78 July 1952.

4. Guernsey, L. H. Overlap in dental practice. Oral Hyg. 43:196 Feb. 1953.

5. Pinckney, E. R. Questionnaire sent to active members of the Alameda County Dental Society, 1953.

tients per day and the number referred by the dentist who treated 35 per day. It was found that 81 dentists who had practiced 6 to 52 years had referred 597 patients, whereas the 17 dentists who had practiced 5 years or less had referred 243 patients. If the dentists who had practiced 6 to 52 years were referring patients at the same rate as those who had practiced five years or less, they would be referring approximately 60 per cent more patients, or five more patients per dentist per four and one-half months.

In a recent dental survey[6] of approximately 7,000 new students who took the required entrance physical examination at one university, not one instance of nondental disease of the mouth region was noted by the examining dentists when queried orally after the examinations were completed. Further examinations by the ear, nose and throat physicians of the same group showed that lesions such as papules, hemangiomas and so forth occurred in almost 3 per cent of the group. Tooth structure indicative of syphilis and other pathologic conditions were remembered when the dentists were questioned, but not one record of these was made, nor one case referred for further study. It appears that even when lesions are present and seen, they do not arouse the examining dentist to investigate further.

It has been questioned whether there are enough symptoms of nondental diseases found in the oral region to warrant the extra time, if any, necessary for an investigation. The following facts concerning syphilis, cancer and tuberculosis show that time spent by the dentist in the detection of disease would be worth while.

DETECTION OF SYPHILIS

In two studies[7] of dental screening in discovery of instances of congenital syphilis in an elementary school for negro children in Muskogee, Oklahoma, the following facts were revealed: Approximately 25 per cent of those with suggestive dental stigmas had a positive serologic test for syphilis. The follow-up study showed that of 884 children of the ages 6 to 14, 29 had stigmas suggestive of congenital syphilis. Of these children, 6 were found to be infected, having positive spinal fluid tests; 3 had previously been treated for syphilis; 10 had negative serologic and spinal fluid tests and the remaining 10 were not tested. In this instance, at least 31 per cent of those suspected had the disease.

A similar study[7] made in Penuscot County, Missouri, showed that approximately one third of those found with dental stigmas suggestive of syphilis had positive serologic reactions in the blood. Many instances of syphilis were detected by investigation of the siblings of those children found to be infected.

It is sometimes supposed that there is little syphilis in this country. In 1952, however, 168,734 new cases of syphilis were reported in the United States.[8] In California 7,459 new cases were reported for 1952, of which 4,614 were in white people and 2,845 were in others. In Alameda County for the same period, there were 501 cases of previously undiagnosed syphilis reported, of which 25 were of the congenital type, in comparison with 350 cases of congenital syphilis in the entire state.[9] It is estimated that of the 7,459 cases discovered in California, at least 10 per cent probably had mouth lesions. At least half of the cases of congenital syphilis might have been previously diagnosed by the dentist because of existing dental stigmas. There is no record of even one case having been discovered by means

6. Pinckney, E. R. Personal study. 1953.

7. Bertram, F. P. Further study of dental screening in congenital syphilis case finding. Bul. Am. A. Pub. Health Den. 12:18 Nov. 1952.

8. Department of Health, Education and Welfare, U. S. Public Health Service, division of venereal diseases. Special report. 1953.

9. State of California Department of Public Health. Morbidity records. 1953.

of dental examination.[10] It is believed not only that the reported cases represent only half of the cases being diagnosed in this state because of failure to report this condition, but also that there are many cases undetected and still existing.[10]

Dental Stigmas of Syphilis • In any phase of syphilis, the patient may be entirely unaware that he has any sign of disease. In the early stage, usually a month or so after contacting the disease, there may be a primary chancre anywhere in the mouth or lip region. This chancre is usually a painless, flat erosion embedded by a subcutaneous indurated mass which feels like cartilage. During the secondary stage, about three months after contact, the lesions are frequently present over the entire body. The mouth lesions consist of slightly raised, glistening, grayish-white, scaly, moist patches on the mucous membranes. These patches usually will bleed if the surface is scraped. The lesions are swarming with live spirochetes, and the disease in this secondary stage is the most contagious. In the third stage, which is usually not manifest for a year or so but which may last for years, there appears a tumor of granulomatous tissue known as a gumma, which may also contain blood vessels. Perforation of the palate may occur at any stage of the disease.[11]

Congenital syphilis affects the teeth at some time in almost all instances. One example is Hutchinson teeth, in which there is crescentic notching of the upper central incisors resulting in peg-shaped teeth. Recent surveys show this to occur in less than 1 per cent of the discovered dental stigmas, and even when it does is usually secondary to other tooth signs. The structure of the crown usually is altered according to the stage or period of calcification at the time of the appearance of syphilis in the body system. Delayed eruption and anomalies of shape, structure and number may occur. The most common manifestation is hypoplasia of the occlusal surfaces, usually of the first molars, and very commonly of all four first molars. There may also be an irregular, roughened surface, poorly developed cusps and a dirty yellow color.

The most recent study showing distribution of teeth presenting signs of congenital syphilis[12] revealed that the first molars were involved 3 to 37 per cent of the time, the cuspids 4 per cent, the mandibular incisors 5 per cent and the maxillary central incisors 6 to 28 per cent. These signs also appear as the result of other conditions; nevertheless, they warrant investigation. It has been estimated that these signs occurring in the first molars, no matter what the cause, are found in about 1 per cent of the population.[6]

DETECTION OF CANCER

In 1947, 10,194 cases of cancer were reported among residents of San Francisco and Alameda Counties.[13] Of these, 6,376, or 62 per cent, were newly diagnosed that year; the remaining 38 per cent were being treated or watched. Of the newly diagnosed primary site cancers, 25 per cent were found subsequent to metastasis; 374, or 6 per cent, were in the buccal cavity or pharynx. Although cancers in this region are discovered more frequently in older age groups, the buccal cavity and pharynx as a primary site ranked third of all localities in the 35 to 44 age group in men. Cancers in this site accounted for 3.2 per cent of all the resident deaths.

The importance of the early detection of cancer in relation to survival need not be discussed in detail. In this particular

10. Brewer, A. F. Personal communication.

11. Mead, S. V. Diseases of the mouth. St. Louis, C. V. Mosby Co., 1940.

12. Bradlaw, R. V. Dental stigmata of prenatal syphilis. Oral Surg., Oral Med. & Oral Path. 6:147 Jan. 1953.

13. Federal Security Agency, Public Health Service. Cancer illness among residents of San Francisco and Alameda Counties, California. 1947.

local study,[13] 9 out of 10 patients diagnosed with localized cancer only, survived at least one year from the time of diagnosis, whereas only 3 out of 10 with remote metastasis when diagnosed were alive at the end of one year.

The dentist need not diagnose the type of cancer located, but he must recognize the importance of his referring the patient involved to a physician. It has been estimated that the dentist is the first to have the chance to detect 90 per cent of all the lesions that occur in the oral region.[14]

DETECTION OF TUBERCULOSIS

The discovery of instances of tuberculosis does not have to be limited to finding tuberculosis lesions in the mouth, which are very rare and occur only in terminal cases,[15] or suspecting the patient with a chronic cough. For example, the Alameda County Tuberculosis and Health Association is sponsoring free chest roentgenograms, and the dentists of the Alameda County Dental Society have been asked to promote this program. Only 44 patients that have been referred by the dentists, however, have had chest roentgenograms taken in a four and one-half month period since the beginning of the program. Of these 44 patients, 2 were found to have pathologic chest conditions in need of treatment.[16] Of 98 dentists questioned, 29 have referred 391 patients and 69 have not referred any.[5] A majority of the dentists simply placed referral blanks and explanatory literature in their waiting room. A few dentists, however, mentioned that they had put the literature in their monthly statements.

In Alameda County there were 510 new cases of reported tuberculosis for the estimated population of 789,100 in 1952, and there were 122 deaths from tuberculosis in the same year. Only 97 cases of the respiratory type were found by roentgenographic surveys.[9]

CLINICAL RECOGNITION OF NONDENTAL DISEASE

It is believed that the chief reason for lack of detection of nondental disease by dentists lies in the professional teaching program. Eighteen per cent of 98 dentists questioned[5] stated that they had never received any training in the clinical recognition of oral nondental disease. Sixty per cent stated that although they had received some training, it was inadequate for their present practice. Only 22 per cent of the dentists felt that they had had sufficient training in the recognition of nondental diseases.

This situation has begun to be corrected in at least one college of dentistry by the broad expansion of the program of dental, or oral, medicine.[17] This subject now is taught through the entire final three years of the curriculum, and includes the differentiation of various pathologic lesions of the mouth and their reflection of systemic disorders. The medical and dental staffs participate, and case study methods are used. A course in public health is given in the dental college which considers communicable diseases and their recognition.[18] The development of these courses is pioneering in the field of dental education; today only a few schools of dentistry offer more than the usual course in oral pathology.[19]

For the dentist already in practice who cannot take advantage of the newer courses in dental medicine, there are postgraduate courses as well as many opportunities offered by society and association monthly and annual meetings. For those unable to attend such meetings with regularity, there are journals which

14. Ellis, J. W. Personal communication.
15. Bryant, J. C. Oral tuberculosis. Am. Rev. Tuberc. 39:738 June 1939.
16. Noble, M. K. Personal communication.
17. Frisbie, H. E. Personal communication.
18. Stiles, W. W. Personal communication.
19. Becks, H. Personal communication.

discuss diseases and conditions other than those treated in the usual dental practice.

RESPONSIBILITY FOR DETECTION OF DISEASE

The question has been raised whether the dentist is overstepping his bounds in the searching for instances of nondental disease. Physicians and dentists are of equal importance in preserving and protecting health. Both are doctors, and, therefore, are responsible individually or as a group for preserving and protecting the health of their patients.

Unfortunately, dentists as an individual professional group are not listed in the Health and Safety Code of the State of California in the section on reportable diseases as those who are legally required to report certain communicable diseases when recognized.[20] The dentist, however, has an obligation to report communicable diseases.

The simplest method for the management of the patient with a newly detected or suspected nondental disease is to refer the patient to his family physician. A recent survey,[21] however, showed that only 49 per cent of almost 4,000 persons queried claimed to have some sort of family physician. If, however, a regular family physician does exist, the patient should be told as much as possible regarding the condition suspected, or if this seems inadvisable, should be strongly advised to see his physician for a thorough examination. A letter should be forwarded to the physician named, preferably not by the patient, explaining the dentist's suspicions. It is inexcusable of the dentist, as well as the physician, to refer the patient and then decide, if the patient does not follow his referral advice, to forget the matter. It is up to the referring dentist to see that the patient is examined before it becomes too late for treatment. The dentist should request a follow-up report of the final conclusions, which would help in making future diagnoses.

If the patient has no family physician, it is the further obligation of the dentist to recommend those men he knows to be proficient enough to carry on the necessary examination. If the dentist is relatively certain of the specific nature of the condition, he should recommend the indicated specialist.

SUMMARY

The detection of nondental disease by the dentist leads to rewards of better public health not only by helping to eliminate communicable disease but also by resulting in better prognosis for the patient involved. The dentist is in a position to detect pathologic conditions because he sees his patients regularly and because symptoms of many diseases are found in the oral region. The importance of detection of syphilis, tuberculosis and cancer are shown by incidence statistics.

Training in clinical recognition of nondental disease is available through courses in dental medicine, dental society programs and various publications.

The dentist has the moral and professional duty of being able to recognize any pathologic condition present in the oral region and to start the patient on the way to the alleviation of such a condition.

344 Montecito Blvd.

20. State of California. Health and Safety Code, 1951.
21. University of California School of Public Health. Health survey. Berkeley, 1948.

Management of finger-sucking habits

Harry Cimring, D.D.S., Los Angeles

A recent issue of a news letter published by a commercial pharmaceutical house contained this item:

> A mechanical appliance previously described as the "Hay Rake" which has been suggested for the correction of thumb-sucking has been used in three children who were also followed psychologically. In all three children the appliance failed to correct the habit and in one it was followed by nightmares, insomnia, anxiety and bedwetting. It is suggested that thorough psychological and psychiatric investigation be made before use of such an appliance. J.A.D.A. 45:114, 1952.[1]

The item quoted was derived from a letter to the editor of THE JOURNAL from Norman Reider, M.D., and Anneliese F. Korner, Ph.D., San Francisco.[2] The letter referred to "The Dilemma in the Management of Thumbsucking," by Edward S. Mack.[3] The three children mentioned were patients of Dr. Mack. The letter also quoted J. H. Sillman:[4]

> . . . that thumb-sucking was prone to affect only those with poor bites and that teeth displaced by thumb-sucking spontaneously find correction after the activity has been discontinued.

Since Dr. Mack's article is scholarly and exhaustive, all the background material he presented will not be restated but rather commented on along with the letter.

The orthodontist's approach to finger-sucking may be somewhat different from that of the pedodontist. The patient is usually seen at a later age. He has come to the orthodontist for the correction of a malocclusion. The primary task is to correct the malocclusion, which may be just the open bite caused by the finger-sucking or a combination of malocclusions resulting from more than one cause. The secondary task is to discourage the pernicious finger-sucking which would prevent or retard the treatment or which would create a recurrence of the malocclusion after the completion of the treatment.

Finger-sucking seems to be normal in infancy. If it persists as the child grows, it becomes the symptom of an emotional need or disturbance and possibly, later, an empty habit. Often, by the time the orthodontist sees the patient, the child has been subjected to the "adult approach" and has been convinced that it is wrong at his age to suck his thumb. He is unable, however, to discontinue the habit. To burden a child who has or has had emotional difficulty with an added "guilt feeling" is, I believe, compounding the problem.

As a result, I take the "casual" approach. It is explained that the teeth

1. News item. Amm-i-gram 2:2 Oct. 1952.
2. Reider, Norman, and Korner, Anneliese F. Psychological effect of device to correct thumb-sucking. J.A.D.A. 45:114 July 1952.
3. Mack, Edward S. Dilemma in the management of thumbsucking. J.A.D.A. 43:33 July 1951.
4. Sillman, J. H. Thumb-sucking and oral structures; serial study from birth to 14 years of age. J. Pediat. 39:424 Oct. 1951.

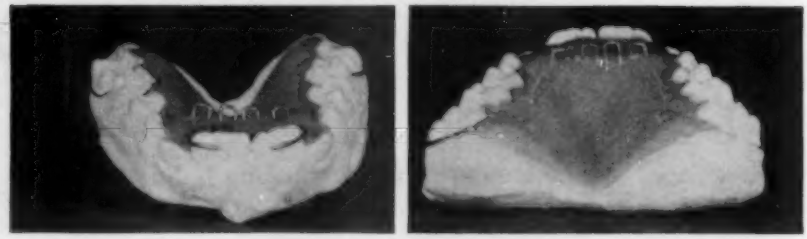

Figure • Appliance used to discourage finger-sucking

are being corrected for functional and cosmetic reasons. The finger-sucking habit is not discussed. This approach is explained to the parent when the child is not present. The parent is asked to abstain from mentioning finger-sucking to the child and only to observe the effect of the appliance and to report back to me.

Of 55 patients ranging in age from 6 to 12 years, the appliance was reported 100 per cent effective the date of being placed with 35 patients, successful in a month or less with 11 and eventually successful with 7. Two patients refused to wear the appliance.

Since a removable Hawley-type appliance is used (illustration), the child is not forced to wear it. This fact precludes "nightmares, insomnia, anxiety and bedwetting"[1] or any other untoward effects. There were some problems connected with the wearing of the appliance, but they were mostly minor ones. Further, I use loops or a bite-plane or both, which preclude any pain.

Those patients who resist discouragement of the habit usually resist treatment in general. With these patients, obviously, the psychological aspect must be considered.

Sillman's first statement that "thumb-sucking was prone to affect only those with poor bites" is rather difficult to demonstrate, whereas his second statement, "teeth displaced by thumb-sucking spontaneously find correction after the activity has been discontinued" is simply wrong in the majority of cases.

CONCLUSIONS

1. The letter mentioned previously and the item summarizing it are misleading.

2. Finger-sucking habits cause extensive and permanent malformation of the dental arches.

3. These habits must be discouraged to attain successful orthodontic correction of malocclusions caused by them.

4. The "casual" approach is recommended.

5. A removable appliance using painless projections has been successful in discouraging finger-sucking habits.

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Cases and Comments

THE COLOR PROBLEM IN JACKET CROWNS

By H. H. Tashjian, D.D.S., Kalamazoo, Mich.

A method has been devised for the proper selection of tooth color for jacket crowns and dentures. Teeth vary in color. For example the six anterior teeth are on a curve of the dental arch and usually tend to shade from light color central incisors to much yellower or darker cuspids. The lateral incisors are not as light as the central incisors nor as opaquely dark as the cuspids. The cuspids have heavier dentinal structure and their enamel portion is only a veneer over the tooth. In the central incisors, the enamel seems to increase in thickness or the dentin diminishes in mass below the cervical half of the teeth. The lateral incisors tend to be darker for there is more dentin in the body or less thick enamel in the incisal zone.

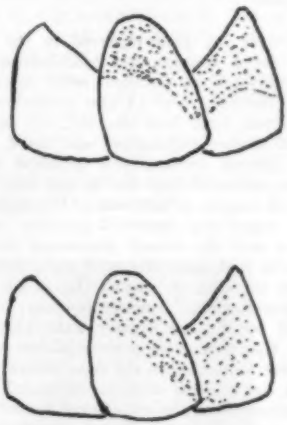
A further determining factor in the coloration or shading of these six teeth is their position in relation to each other. Some arches are fairly round, and their front portion is a slight curve of the arc while other arches approach the angular form, pointed in the incisal region and extending distally in a line corresponding to the sides of a triangle. The variations from these two extremes are familiar to all.

An example of the method of color selection is given here. A jacket for a left central incisor is to be made. After the proper shaping of the tooth, a color is selected in the shade guide to match the original tooth. This selection of color must be done in daylight, and there must not be any sun glare in the room. A north light is ideal.

According to the shade guide, the right central incisor is a light tooth. But if the jacket color is selected according to the shade guide, the jacket may still appear too light when in place. Although the shade guide indicated the correct color of the right central incisor, it failed to show the color relationship between the distal side of the left central incisor and the left lateral incisor. The new tooth or jacket must be made in two distinct colors placed vertically.

It is possible also to construct the crown in a second way. The cervical section of the jacket is made predominantly the shade of the darker portion of the lateral incisor. The darker color curves from the cervical section down across the tooth almost to the distal incisal edge of the crown (illustration, above). In this way, the jacket matches the two adjacent teeth.

This method has many variations. Defects in the adjacent teeth, odd pigmentation and positional abnormalities must be taken into account. However, the fundamental principle is the same. The dentist must visualize shape, angle, color and mass of tooth structures on both sides of the restoration in order to decide on which side of the restoration certain characteristics must be incorporated.



Restoration (center) shaded to match adjacent teeth

The vertical or lateral evaluation of color or characteristic necessitates figuring out carefully what proportion of a tooth must be of a certain color. An arbitrary cervicodistal coloration will not always be suitable. Variations sometimes necessitate dividing the artificial tooth into two diagonal triangles instead of curving it from the cervical section to the distal aspect. This is done often in very pointed and protrusive arches (illustration, below).

Although some experience is required, even an inexperienced man can achieve better results by the simple two-color arrangement than he can by the one color sampling of the ordinary shade guide.

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GEMINATION—REPORT OF TWO CASES

By Philip J. Boyne, D.M.D., Bethesda.

The term gemination has been applied to the condition in which a double crown is attached to a single root. Although occasionally observed in deciduous teeth, gemination is exceedingly rare in the permanent dentition.

One instance of gemination of the maxillary central incisor occurring bilaterally and one instance occurring unilaterally were observed in a routine examination of 2,000 men in the naval service.

CASE 1

A 21 year old man reported to the dental clinic for a routine oral examination. Both maxillary central incisors were abnormally wide (the right was 14 mm mesiodistally at the incisal edge and the left, 13 mm). A lingual silicate restoration was noted in the right central incisor, and a labial enamel groove extended from the incisal edge to the gingival margin (illustration). The right maxillary cuspid was displaced laterally, and the patient said the second permanent maxillary bicuspids had been extracted eight years previously in order to correct the existing malocclusion, which apparently was in part caused by the abnormally wide central incisors. Roentgenographic examination revealed a double root canal in the right central incisor and a single canal with an abnormally large pulp chamber in the left central incisor. Many lobulations of the enlarged cingulum were evident on both oral and roentgenographic examination. No pathologic condition was found around the apexes of the teeth. The patient was asymptomatic and no treatment was indicated.

CASE 2

In the routine examination of a 36 year old man, it was noted that the left maxillary central incisor was abnormally wide (13 mm at the incisal edge). A deep enamel groove extended from the incisal edge to the cingulum on the lingual aspect. There was also a faint trace of a developmental groove on the labial surface. Roentgenograms revealed a large pulp chamber with pronounced pulpal horns and a single root canal. No pathologic condition was present, and the patient was asymptomatic. The right central incisor was normal in size and shape.

Gemination should not be confused with fusion, which is characterized by the union of two teeth by a common covering of enamel. Fused teeth usually possess separate pulpal cavities, whereas gemination commonly presents a single root structure with an enlarged pulp canal.

Apart from being of academic interest, these dental anomalies afford a striking clinical manifestation of the morphogenetic processes of tooth development.

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The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

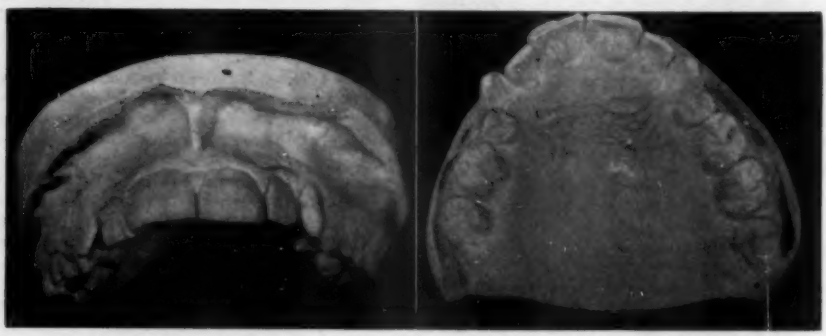


Illustration • Left: Gemination of maxillary central incisors. Note enamel groove of the right central incisor. Right: Palatal aspect of geminated central incisors, showing furrowed cingulum and notched incisal edge of right central incisor

EXPERIMENTAL REPLANTATION OF AN UPPER THIRD MOLAR

By Edward L. Crain, D.D.S., Minneapolis.

Replantation of teeth invariably results in root resorption. Rates of resorption vary considerably, and the following is a report of a replanted tooth which has exhibited a very slow rate of root resorption.

The patient had a carious vital upper right third molar. It was decided to extract the tooth, fill the root canals and replant the tooth as an experiment. A search of the literature failed to disclose a previous case of replantation of a third molar.

The tooth was extracted under local anesthesia. Tinfoil was adapted around the root, and the tooth was imbedded in quick-setting impression plaster with the apex of the tooth exposed to aid in instrumentation.

The pulp chamber was opened, and the canals enlarged in the routine manner. The canals were sterilized with phenolsulfonic acid, washed with sodium hypochlorite and dried thoroughly with sterile absorbent points. Silver points of the correct size were cemented into the canals using root canal sealer. Carious parts of the tooth were removed and a restoration placed. The tooth was removed from its matrix at this point, washed, and placed in a solution of 1:1000 parts benzalkonium chloride.

Approximately an hour and 45 minutes after it was extracted, the tooth was replanted in the socket. No anesthesia was necessary, and the tooth was not stabilized in any way. The tooth was mobile and tender for ten days. The soreness reached its peak three days after replantation, then gradually subsided. At the end of three weeks, the tooth was firm, comfortable and in normal function. The gingiva around the tooth was firm with a healthy normal pink color.

Roentgenographic examination has been made periodically, and after 18 months the root apexes show a slight amount of resorption (illustration). It is expected that resorption will continue to take place at a very slow rate during the ensuing months.

524 La Salle Building

Carious third molar before replantation, 6, 12 and 18 months after replantation showing slow rate of root resorption

PROSTHETIC REPLACEMENT FOR ATHLETE'S THUMB

By Wendell T. Jackson, St. Louis.

The loss of a thumb on the catching hand of a first baseman is a great handicap, a handicap made especially serious because of the active participation required of a first baseman and because of the velocity of the ball which he must catch. The thumb and index finger play an essential part in the catch.

The patient, a professional baseball player, lost his left thumb to the metatarsus bone as a result of mortar fragmentation. Roentgenograms and physical examination disclosed a limitation of movement in flexion, extension and rotation. There was loss of the dense fibroareolar tissue which, with the palmar aponeurosis, forms the superficial palmar fascia. Therapeutic exercises were instituted to alleviate the limitations in movement.

A hydrocolloid impression of the patient's left hand, wrist and lower portion of forearm was secured. A stone model was constructed from the impression, and 16 gauge relief was placed on the cast to cover the anticipated design area.

Next, an acrylic splint was fabricated. Then, employing impression compound dental type III-low heat, muscular trim of the following involved muscles was obtained: opponens pollicis, abductor pollicis brevis, flexor pollicis brevis, adductor pollicis transversus and adductor pollicis obliquus.

A final wash impression for correction of any minor defects was secured with hydrocolloid. A master model was constructed of stone. Two appliances were needed; one for catching purposes, with a dorsal flange for stabilization, and one for the batting grip, constructed to enable the hitter to give the wrist snap, a necessary motion for a good hit.

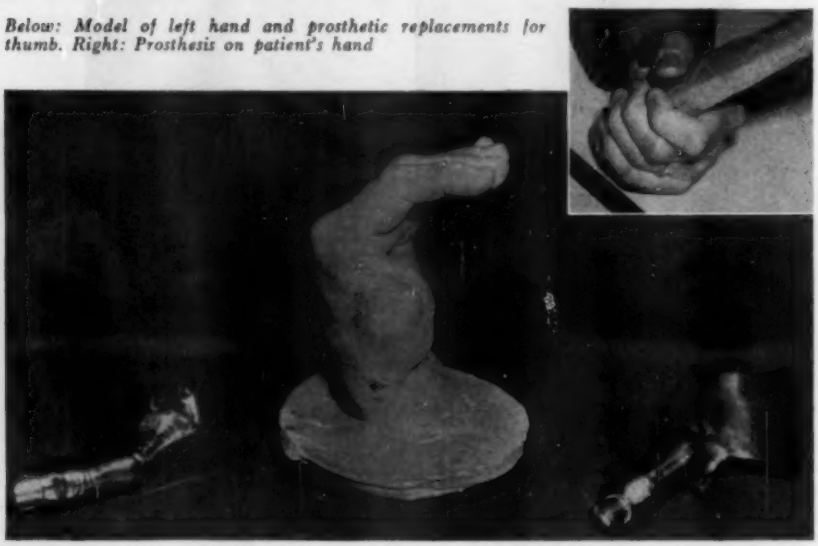
The designs were transposed to the master model. The chrome-cobalt technic of wax-up and casting was used. The castings were sandblasted but not polished and were checked for proper fit and contour. The "batting" appliance was constructed with the patient's advice as to the type of grasp which he formerly employed.

Two types of retentive covering were constructed; a latex rubber glove of medium weight, tight fitting, to cover the thumb, palmar and dorsal portion of the hand, and a light-weight strong leather covering with adjustable clasps secured to slightly raised metal loops on the casting. Use would determine which covering was most satisfactory.

After a period of adaptation, the patient was able once again to participate actively in baseball.

Major, Dental Corps, prosthetic officer, Fifth Army Central Dental Laboratory, St. Louis.

Below: Model of left hand and prosthetic replacements for thumb. Right: Prosthesis on patient's hand



BILATERAL DENTIGEROUS CYSTS INVOLVING FIRST MOLARS

By Joseph C. Tam, D.D.S., San Diego

A dentigerous cyst is formed through retrograde changes of remnants of the enamel epithelium of unerupted teeth whose amelogenesis has been completed. These cysts have been found in all parts of the maxilla and mandible. Multiple dentigerous cysts are not uncommon. Familial tendency and recurrence have been reported in the literature. Recurrence results from incomplete removal of a cyst, or from a nidus of unsuspected epithelial cells resting adjacent to the region of the recently removed dentigerous cyst.

Complete enucleation of the cystic sac and surgical removal of the involved tooth is one method of treatment of a dentigerous cyst. Another method of treatment is to enucleate only the cyst in the hope that the involved tooth will erupt into functional occlusion. The latter method of treatment was employed in this case.

Report of Case • A 7 year old boy with "bumps" in the lower right and left first molar regions was seen at the School of Dentistry, University of Minnesota, on June 6, 1952. Swelling of the left cheek in February 1952 was the first evidence of the occurrence of a lesion. A thorough examination, including a biopsy, by his local dentist had been negative. Monthly clinical observations since the examination had revealed no unusual symptoms or complaints.

Examination • A bony elevated lesion was seen on the buccal side of the lower left first molar. It extended horizontally from the distal aspect of the first deciduous molar to the second molar and inferiorly from the crest of the ridge to the lower border of the mandible. The region was slightly tender to palpation. No pus was expressed. An oval, movable and firm submaxillary lymph node 6 mm. in diameter was palpated at the inferior border of the left side of the mandible just below the lesion.

A similar lesion slightly smaller in size in the lower right first molar region also was noted. A bluish area, spongy in consistency, measuring about 4 mm. in diameter was evident within the crest of the lesion. In addition, a fistulous tract on the buccal side of the first deciduous molar was present.

Roentgenograms of the lower right and left first molar regions disclosed a radiolucent area with a definite boundary involving the crowns of these molars (Fig. 1). The roentgenograms upheld the clinical impression that these lesions were dentigerous cysts.

Treatment and Course • On July 14, 1952, under three drams of pentobarbital (Elixer Nembutal) and local anesthesia given by the usual dental technic, a large buccal mucoperiosteal flap was raised in the lower left first molar region. The lesion was uncovered with a chisel. A reddish fibrous sac was enucleated in several pieces and retained for histological studies. Prior to closure of the wound, five 50,000 units of pure crystalline penicillin G tablets containing no buffer were inserted into the wound. The histological report of the tissues showed the possibility of simple chronic inflammation of remnants of enamel organ. Some degenerate epithelium was present on the surface of the fibrous tissues.

The lesion in the lower right first molar region was treated surgically ten days later in a similar manner. The nonvital lower right first deciduous molar was extracted intact. A histological examination of the second enucleated lesion revealed it to be a cyst with

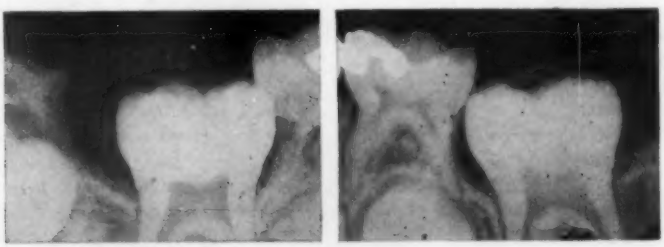


Fig. 1 • Radiolucent areas with definite boundaries involving crowns of unerupted lower right and left first permanent molars

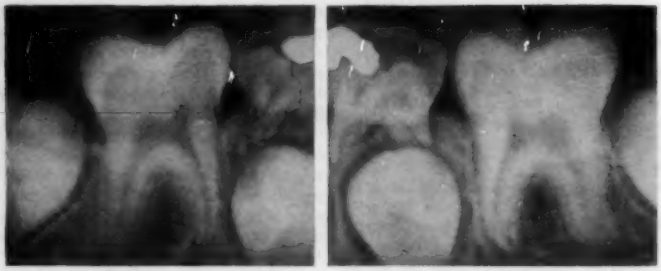


Fig. 2 • Lower right and left first permanent molars erupted into functional occlusion approximately six months after enucleation of dentigerous cyst

a thick fibrous capsule lined with an edematous epithelium which was infiltrated with lymphocytes and plasma cells. In both instances the histological findings substantiated the preoperative impression of bilateral dentigerous cysts involving the mandibular first permanent molars.

When the patient was seen on January 2, 1953, the lower first permanent molars had erupted into occlusion, although in slight buccoversion (Fig. 2). According to the roentgenographic and clinical observations, a recurrence seems unlikely. The oral hygiene was poor.

Summary • If an unerupted tooth within a dentigerous cyst has sufficient space for eruption or by orthodontic means can be made to be of functional value, surgical removal of the tooth is contraindicated. As demonstrated in this case report, the involved tooth will erupt into functional occlusion after enucleation of the cyst. This conservative method of treatment should be attempted first, within reason, regardless of the size of the cyst, the presence of infection or the age of the patient. Should the involved tooth fail to erupt, it can then be removed surgically.

3129 Afton Road

Scientific Curiosity • The scientist is not content to stop at the obvious. *C. H. Mayo, "Problems in Medical Education," Collected Papers of the Mayo Clinic & Mayo Foundation 18: 1093, 1926.*

COUNCIL ON DENTAL RESEARCH

List of certified dental materials revised to December 15, 1954

Because there has been some confusion regarding certified dental materials, the Council on Dental Research presents this summary to clarify the operation of its certification plan.

The first fundamental item in this plan is the existence of official American Dental Association Specifications for Dental Materials. These specifications are the outcome of research by the American Dental Association Research Fellowship at the National Bureau of Standards correlated with the clinical experience of members of the Association.

As the second step in the operation of the plan, the manufacturers are invited to certify to the Council on Dental Research that their products comply with the specifications. It would be manifestly impossible for the Council (through the American Dental Association Research Fellowship at the National Bureau of Standards) to test every lot of every certified material. For this reason, the Council has required that the manufacturer, on certifying a product, not only must guarantee that this product meets specification requirements but also must furnish evidence that he maintains a testing program adequate to insure continual compliance of the product.

On receipt of a certification for a new product with all required data, the Council procures a random sample through regular trade channels, usually by asking a dentist to act as its agent. This sample is tested for compliance with all specification requirements. Only when the certification is complete and in proper form and the sample has passed all specification tests does the Council accept the manufacturer's certification. The name of the product is then added to the list of certified dental materials.

This, however, is not the complete story. The continuation of any product on the list of certified dental materials is contingent on its maintenance at specification quality. Surveys of all products on the list are made by the American Dental Association Research Fellowship at the Council's direction. These surveys are made on samples procured on the open market. Whenever a material fails to comply with the specification requirements, it is removed from the list and the manufacturer is notified that his certification of the product is no longer acceptable. Thus, although the Council cannot test the entire production of dental materials, its certification plan calls for continuous testing by the manufacturer and check tests by the Fellowship so that a constantly high level of quality of the products on the list will be maintained. Revisions of the list appear in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION from time to time.

Lately there have appeared through the mail some advertisements for amalgam alloys, mercuries, zinc phosphate cements and acrylic resins with statements

that the manufacturer guarantees them to comply with the specifications of the American Dental Association. An examination of the list of certified dental materials shows that some of the materials that have been so advertised have not been certified by their manufacturers to the Council on Dental Research. The certification program is financed jointly by federal and American Dental Association funds, and no charge whatsoever is made to the manufacturer. If a manufacturer is regularly testing his material, then the only expense he will have in certifying the material to the Council is the cost of the three cent stamp required for mailing the certificate and data. When a dentist sees a statement such as, "Every batch of this alloy is carefully tested before being released for shipment to be sure that it fully meets A.D.A. specifications," he should be certain to check the list of certified dental materials to see if the product appears there.

In the purchase of certified material for use in dental practice, this list should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the list and for a statement thereon guaranteeing compliance with the specification. The Council should be notified of any discrepancies.

CERTIFIED AMALGAM ALLOYS
(A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or distributor*
Abner Fine Cut; Oxford	Abner Alloys Co.
Accurate Metalloy (filings)	The L. D. Caulk Co.
Argentum "A" cut; fine cut; medium cut; shavings	Hammond Dental Mfg. Co.
Aristaloy	Baker & Co., Inc.
Banner (filings)	Goldsmith Bros. Smelting & Refining Co.
Baring (improved fine cut)	Baring Smelting & Refining Co.
Brewster Medium	Brewster Laboratories
Certified	Lee Smith Co.
Cresilver	Crescent Dental Mfg. Co.
Dee (filings)	Kerr Mfg. Co.
Excel	Daniels Dental Alloy Co.
Fellowship	Dental Protective Supply Co.
Filling alloy, fine grain	Abe Bass
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting & Refining Co.
Gem	Certified Dental Supply Corp.
Gold Bond	Jefferson Dental Supply Co.
H & M Special	Hauser and Miller
Lustraloy Regular	Pfingst & Co.
Minimax (filings) 173; 177; 178; 178 non-zinc; 178 fine cut; 183; White Gold & Platinum; (shavings) 177; 178	The Minimax Co.
Mission No. 5; No. 5 "A" Cut	Henry F. Bruce Co.
Modeloy (quick setting filings)	Crescent Dental Mfg. Co.
Mynol Improved	Mynol Chemical Co.
National Dental	Eskay Dental Products
New Deal	Miller Dental Co.

Alloy	*Manufacturer or distributor*
Oceanic Filling Alloy	Oceanic Chemical Co., Inc.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. Smelting & Refining Co.
Peerless	Herbert D. Damsky
Precision	Precision Bur Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Super First Setting	Garhart Dental Specialty Co.
Safco 69	Safco Laboratories
Silver Crown Fast; Medium; Slow; Non Zinc	General Refineries, Inc.
Silverloy (filings); F. C. #20 for Proportioner; (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting & Refining Co.
S-C Medium (filings)	Stratford-Cookson Co.
Standard	Standard Dental Products Co.
Stratco	Edward P. Stratt
Tri-Alloy	Tri-Boro Dental Supply Co., Inc.
True Dentalloy (filings); Cut "A"	The S. S. White Dental Mfg. Co.
Twentieth Century Regular; Special; Fine Cut; Non Zinc	The L. D. Caulk Co.
Ultra Brand	H. Jelinek
Vertex	Vertex Dental Products Co.
White Beauty; Fine Cut	Lang Dental Mfg. Co.
Yates Balanced	J. Yates Dental Mfg. Co

CERTIFIED INLAY CASTING INVESTMENTS
(A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or distributor*
Baker Cristobalite	Baker & Co., Inc.
Beauty-Cast	Whip-Mix Corp., Inc.
Kerr Cristobalite-Inlay	Kerr Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Steele's-Super	The Ransom & Randolph Co.

CERTIFIED IMPRESSION COMPOUNDS
(A.D.A. SPECIFICATION NO. 3)

Compound	*Type*	*Manufacturer or distributor*
Certified	I	Lee Smith Co.
Exact	I	The S. S. White Dental Mfg. Co.
Kerr Perfection; No. 2 Soft Green; Grey; White; Black	I	Kerr Mfg. Co.
Mizzy-Low Heat	I	Mizzy, Inc.
S. S. White-Black-Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED INLAY CASTING WAXES
(A.D.A. SPECIFICATION NO. 4)

Wax	*Manufacturer or distributor*
Baker-Blue—regular medium	Baker & Co., Inc.
Caulk-Blue	The L. D. Caulk Co.
Kerr-Blue—Hard	Kerr Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Taggart's Blue	Mizzy, Inc.

CERTIFIED INLAY CASTING GOLD ALLOYS
(A.D.A. SPECIFICATION NO. 5)

TYPE A, SOFT

Alloy	*Manufacturer or distributor*
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Chilcast No. 1	Vernon-Benshoff Co.
Coe 1	Coe Laboratories, Inc.
Crown Inlay No. 2 Soft; K	General Refineries, Inc.
Deeone	Dee Division of Handy & Harman
GB Inlay No. 1 Soft	Goldsmith Bros. Smelting & Refining Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Krause Soft Inlay	Krause Gold Refinery
Leff Light Inlay	Benjamin R. Leff
Luft "A"	John Luft Prescription Alloys
Mowrey's S-1	W. E. Mowrey Co.
Ney-Oro A; AA	The J. M. Ney Co.
Noble No. 1	Noble Metals & Alloys Co.
Research A	Precious Metals Research Works, Inc.
Spyco Soft; Eleven	Spyco Smelting & Refining Co.
S. S. White No. 2; 900 Soft; 940 Very Soft	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Wildberg A-2	Wildberg Bros. Smelting & Refining Co.
Wilkinson 2S	Wilkinson Co.
Williams Inlay 3; Will-Cast 22	The Williams Gold Refining Co., Inc.

TYPE B, MEDIUM

Alloy	*Manufacturer or distributor*
Aderer-B-Medium	Julius Aderer, Inc.
Aleco No. 1; No. 2	A. L. Engelhardt Co.
Baker Inlay Medium	Baker & Co., Inc.
Chilcast M; 2M	Vernon-Benshoff Co.
Coe 2	Coe Laboratories, Inc.
Crown Inlay No. 1 Hard; Knapp No. 2; T	General Refineries, Inc.
Deetwo	Dee Division of Handy & Harman
GB Inlay No. 2 Medium Hard	Goldsmith Bros. Smelting & Refining Co.
Jelenko Modulay; Platincast	J. F. Jelenko & Co., Inc.
Krause Hard Inlay	Krause Gold Refinery
Leff Medium Soft	Benjamin R. Leff
Luft "B"	John Luft Prescription Alloys
Mowrey's B-Inlay; S-2; No. 91	W. E. Mowrey Co.
Ney-Oro A-1; A-10	The J. M. Ney Co.
Noble No. 2	Noble Metals & Alloys Co.
Spyco Inlay; Medium; Tinker one	Spyco Smelting & Refining Co.
S. S. White No. 1; No. 5; No. 820	The S. S. White Dental Mfg. Co.
Stern 1	I. Stern & Co., Inc.
Wildberg "A"; C-2	Wildberg Bros. Smelting & Refining Co.
Wilkinson 8M	Wilkinson Co.
Williams Pioneer; Special Inlay; One "Inlay"	The Williams Gold Refining Co., Inc.

TYPE C, HARD

Alloy	*Manufacturer or distributor*
Aderer-C Hard; "Dressel"	Julius Aderer, Inc.
Aleco No. 4	A. L. Engelhardt Co.

Alloy	*Manufacturer or distributor*
Baker Hard Inlay	Baker & Co., Inc.
Chilcast No. 2; No. 2-H	Vernon-Benshoff Co.
Coe 3	Coe Laboratories, Inc.
Crown No. 9; Knapp No. 3; Supreme Inlay; TT	General Refineries, Inc.
Deesix	Dee Division of Handy & Harman
GB Inlay No. 3 Hard	Goldsmith Bros. Smelting & Refining Co.
Jelenko Durocast; Firmilay	J. F. Jelenko & Co., Inc.
Leff C	Benjamin R. Leff
Luft "C"	John Luft Prescription Alloys
Mowrey's S-3; Special; No. 120	W. E. Mowrey Co.
Ney-Oro B; B-2; BW	The J. M. Ney Co.
Noble No. 3	Noble Metals & Alloys Co.
Research No. 5; "Inlay"	Precious Metals Research Works, Inc.
Spyco No. One-H; Six; Tinker Two; Hard	Spyco Smelting & Refining Co.
S. S. White No. 8; No. 13; 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2; 3337; H	I. Stern & Co., Inc.
Wildberg "C"; B	Wildberg Bros. Smelting & Refining Co.
Williams Klondiker; Special "Four"	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL MERCURIES
(A.D.A. SPECIFICATION NO. 6)

Mercury	*Manufacturer or distributor*
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Certified	Lee Smith Co.
Chemically Pure	The S. S. White Dental Mfg. Co.
C. P. Mercury	Goldsmith Bros. Smelting & Refining Co.
Crown	General Refineries, Inc.
Dee Brilliant	Kerr Mfg. Co.
Dental	Drug Laboratories, Inc.
Dental, C. P.	F. W. Berk & Co., Inc.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield Smelting & Refining Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Merck Redistilled N.F.	Merck & Co., Inc.
Mercury C. P.	Metalsalts Corp.
Mercury C. P.	Wildberg Bros. Smelting & Refining Co.
Mercury N. F. IX Redistilled	Mallinckrodt Chemical Works
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mowrey Mercury	W. E. Mowrey Co.
Mynol	Mynol Chemical Co.
Ney	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
Spectropure	Baker & Co., Inc.
Spyco	Spyco Smelting & Refining Co.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass.)

CERTIFIED WROUGHT GOLD WIRE ALLOYS
(A.D.A. SPECIFICATION NO. 7)

Alloy	*Manufacturer or distributor*
Aderer No. 1; No. 3; No. 4; No. 20 Clasp	Julius Aderer, Inc.
Baker Q. A.	Baker & Co., Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Dee Division of Handy & Harman
GB Extra High Fusing; Medium Fusing; Regular High Fusing	Goldsmith Bros. Smelting & Refining Co.
Jelenko No. 3 Wire; Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4	The J. M. Ney Co.
Spyco No. 2; No. 4	Spyco Smelting & Refining Co.
S. S. White No. 12; No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern and Co., Inc.
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.
Williams No. 1 Super; No. 2 High Fusing Clasp; No. 3 High Tensile	The Williams Gold Refining Co., Inc.

CERTIFIED ZINC PHOSPHATE CEMENTS
(A.D.A. SPECIFICATION NO. 8, FIRST REVISION)

Cement	*Manufacturer or distributor*
Ames Z-M	The W. V-B. Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge; Petroid Improved; Tenacin	The L. D. Caulk Co.
Certicem	Lee Smith Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Crown Bridge and Inlay	Lang Dental Mfg. Co.
S-C	Stratford-Cookson Co.
Smith's	Lee Smith Co.
S. S. White Silver Improved; Zinc; Zinc Improved	The S. S. White Dental Mfg. Co.

CERTIFIED SILICATE CEMENTS
(A.D.A. SPECIFICATION NO. 9)

Cement	*Manufacturer or distributor*
Ames Plastic Porcelain	The W. V-B. Ames Co.
Astralit	Premier Dental Products Co.
Baker Plastic Porcelain	Baker & Co., Inc.
DeTrey's Synthetic Porcelain; Syntrex	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel Improved	Lee Smith Co.
S. S. White Filling Porcelain Improved	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS—AGAR TYPE
(A.D.A. SPECIFICATION NO. 11)

Material	*Manufacturer or distributor*
Coe-Loid 66	Coe Laboratories, Inc.
Deelastic	Kerr Mfg. Co.
Dentocoll	The L. D. Caulk Co.
Elastic Colloid	The S. S. White Dental Mfg. Co.
Kerr Hydro-Colloid	Kerr Mfg. Co.

Material	*Manufacturer or distributor*
Perfectocoll	Baker & Co., Inc.
Plasticoll	Lee Smith Co.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE RESINS
(A.D.A. SPECIFICATION NO. 12)
TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite	Clear; pink; powder-liquid	Acralite Co., Inc.
Ac-Ril	Pink; powder-liquid	Ac-Rill Dental Corp.
Acri-Lux	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Acrylic A Pink	Pink; powder-liquid	Austenal Laboratories, Inc.
Acrylic A Mottled	Pink; powder-liquid	
Acrylic A Orange Pink	Pink; powder-liquid	
B-B	Clear; pink; powder-liquid	Bell Dental Products Co.
Certified	Clear; pink; powder-liquid	Lee Smith Co.
Coe Acrylic	Pink; powder-liquid	Coe Laboratories, Inc.
Coralite	Pink; powder-liquid	Coralite Dental Products Co.
Crystolex, Form 102	Pink; powder-liquid	Kerr Mfg. Co.
Densene 33	Clear; pink; powder-liquid	Cosmos Dental Products, Inc.
Densene 33, Varihued	Pink; powder-liquid	
Denture Acrylic	Clear; pink; powder-liquid	The S. S. White Dental Mfg. Co.
Duraflow	Pink; powder-liquid	Product Research Lab., Inc.
Enciton	Pink; powder-liquid	The L. D. Caulk Co.
Hygienic	Pink; powder-liquid	The Hygienic Dental Mfg. Co.
Improved Justi-Tone T-3	Pink; powder-liquid	H. D. Justi & Son, Inc.
Jectron	Pink; precured blank	Toledo Dental Products Co.
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear; pink; powder-liquid	The L. D. Caulk Co.
Luxene 44	Pink; plastic cake	Luxene, Inc.
Marvel	Pink; powder-liquid	Marvel Dental Products Co.
Miracryl	Pink; powder-liquid	The Motloid Co., Inc.
Opalex "45"	Pink; powder-liquid	The Opalex Co.
Oryl Brand	Pink; powder-liquid	The Wm. Getz Corporation
Palatex	Pink; powder-liquid	Rockland Dental Co., Inc.
Perma Cryl	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Q. E. D.	Pink; powder-liquid	H. D. Justi & Son, Inc.
Standard Brand	Pink; powder-liquid	Ray Foster Dental Supplies
Vernonite	Clear; pink; plastic cake	Vernon-Benshoff Co.
	Pink; powder-liquid	
Vitacrylic D, L	Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Clear; pink; powder-liquid	Vita-Lite Products Co.
Vitalon	Pink; powder-liquid	Austenal Laboratories, Inc.

TYPE II, SELF-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite 88, Tissue Tone	Pink; powder-liquid	Acralite Co., Inc.
Acralite 88, True Life	Pink; powder-liquid	
Densene 33	Pink; powder-liquid	Cosmos Dental Products, Inc.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies* and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Benzethonium Chloride (See A.D.R. ed. 20, p. 86)

Hya-Cide 1:1,000 Germicidal Solution (E. R. Powells): Benzethonium chloride, 0.1 per cent in water with sodium nitrite, 0.55 per cent and color.

Calcium Carbonate, Precipitated, U.S.P. (See A.D.R. ed. 20, p. 110)

Albacar Precipitated Calcium Carbonate Medium, Light and Extra Light (C. K. Williams & Co.): A brand of precipitated calcium carbonate, $CaCO_3$. For use in dentifrices as an abrasive.

Sorbitol Solution (See A.D.R. ed. 20, p. 118)

Atlas 70% Sorbitol Solution-Sorbo Brand (Atlas Powder Company): Sorbitol solution is used as a humectant, plasticizer and binder ingredient in toothpastes.

Penicillin (See A.D.R. ed. 20, p. 62)

Penicillin Potassium Troches, 20,000 Units (Abbott Laboratories): Stated to contain penicillin G potassium in a flavored base.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

The following additional products are classified in Group B:

Tetracycline (See A.D.R. ed. 20, p. 71)

Tetracycline hydrochloride is an antibiotic which has been accepted for inclusion in *New and Nonofficial Remedies.* Because the dental uses of tetracycline have been incompletely evaluated, no brands of this antibiotic are currently listed in *Accepted Dental Remedies,* al-

though two brands are classified in Group B.

Tetracycline hydrochloride may be produced by the growth of a selected strain of an unidentified species of streptomyces in a suitable medium or from the chemical treatment of chlortetracycline. It is a yellow crystalline, odorless powder.

Tetracycline appears to possess the same bacterial spectrum as does chlortetracycline (Aureomycin) and oxytetracycline (Terramycin). These three antibiotics are very closely related chemically. Their toxic effects are similar but preliminary reports generally agree that the use of tetracycline is accompanied by a significantly lower incidence of gastrointestinal symptoms than is the use of chlortetracycline or oxytetracycline.[1]

Dosage schedules for tetracycline are still under study but the currently suggested minimum daily dosage for the adult is 1 Gm. divided into four equal parts. Severe infections may require a higher dosage and dosage for children should be proportionately lower.

As in the case of the other broad spectrum antibiotics an overgrowth of yeast-like organisms may occur during the course of tetracycline therapy. Therefore the patient should be checked closely for any evidence of the development of thrush or other monilial infections during the course of treatment with tetracycline.

Achromycin Hydrochloride (Lederle Laboratories Division, American Cyanamid Co.): A brand of tetracycline hydrochloride.

Achromycin Hydrochloride Capsules, 50 mg., 100 mg., 250 mg.: Stated to contain tetracycline hydrochloride and excipients.

Achromycin Hydrochloride Intravenous: Stated to contain tetracycline hydrochloride buffered with ascorbic acid. In vials, 100, 250 and 500 mg.

Achromycin Hydrochloride Soluble Tablets, 50 mg.: Stated to contain tetracycline hydrochloride and water-soluble excipients.

Achromycin Hydrochloride Spersoids, 50 mg. per 3 Gm.: Stated to contain tetracycline hydrochloride and excipients.

Achromycin Hydrochloride Tablets, 50 mg., 100 mg., 250 mg.: Stated to contain tetracycline hydrochloride and excipients. For oral administration.

Achromycin for Oral Suspension: When prepared as directed, each 5 cc. of the suspension is stated to contain tetracycline equivalent to 250 mg. of tetracycline hydrochloride. In 1 fluid ounce bottle, containing tetracycline equivalent to 1.5 Gm. of tetracycline hydrochloride in a dry flavored mixture. For oral administration.

Achromycin Pediatric Drops: When prepared as directed, each cc. of suspension is stated to contain tetracycline equivalent to 100 mg. of tetracycline hydrochloride. In 10 cc. bottle, containing tetracycline equivalent to 1.0 Gm. of tetracycline hydrochloride in a dry flavored mixture.

Tetracyn Hydrochloride (Pfizer Laboratories): A brand of tetracycline hydrochloride.

Tetracyn Hydrochloride Tablets 50 mg., 100 mg., 250 mg.: Stated to contain tetracycline hydrochloride and excipients.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

1. Finland, Maxwell, and others. Clinical and laboratory observations of a new antibiotic, tetracycline. J.A.M.A. 154:561 Feb. 13, 1954.

COUNCIL ON DENTAL EDUCATION

Additional hospital dental internships and residencies approved by the Council on Dental Education (supplement 2)

The Council on Dental Education and its Committee on Internships and Residencies announced on December 7, 1954, the approval of the following additional educational programs in hospitals. The revised list of approved internships and residencies was published in May, 1954, and Supplement 1 appeared in the August 1954 issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. As additional programs are approved they will be announced in THE JOURNAL. A complete listing of approved internship and residency programs is available from the Council on Dental Education on request.

Hospital	Type of program approved	Length of program approved (months)	Number of positions available	Date the service begins
CALIFORNIA				
U. S. Naval Hospital Camp Pendleton, California Capt. James J. Dempsey, Chief of Dental Service	Internship Rotating	12	2	July
U. S. Naval Hospital Corona, California Capt. O. H. Schlicht, Chief of Dental Service	Internship Rotating	12	2	July
San Francisco Hospital (College of Physicians and Surgeons—Stanford University) Potrero and 22nd San Francisco 10, California Dr. J. Leonard Schmitz, Chief of Dental Service	Residency Oral surgery	24	1	July
DISTRICT OF COLUMBIA				
Freedmen's Hospital 6th and Bryant Streets, N.W. Washington 25, D. C. Dr. John A. Turner, Chief of Dental Service	Internship Oral surgery	12	2	July

Hospital	Type of program approved	Length of program approved (months)	Number of positions available	Date the service begins
NEW YORK				
Veterans Administration Hospital Cropsey and 7th Avenues Brooklyn 9, New York Dr. Henry C. Sandler, Chief of Dental Service	Internship Rotating	12	2	July
NEW YORK (cont'd)				
Gouverneur Hospital 621 Water Street New York 2, New York Dr. Bernard Clug, Chief of Dental Service	Internship Oral surgery	12	2	July
NORTH CAROLINA				
Veterans Administration Hospital Fulton Street and Erwin Road Durham, North Carolina Dr. Kenneth R. Pfeiffer, Chief of Dental Service	Residency Oral surgery	24	1	July

The following changes have been made in the list of approved internship and residency programs published in the May 1954 and August 1954 issues of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

MASSACHUSETTS				
Massachusetts General Hospital Fruit Street Boston 14, Massachusetts Dr. David Weisberger, Chief of Dental Service	*Change from* Internship Mixed *To* Internship Oral surgery	12	2	July
Worcester City Hospital 71 Jaques Avenue Worcester 3, Massachusetts Dr. Leo Berg, Chief of Dental Service	*Change from* Internship Rotating *To* Internship Oral surgery	12	2	July

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The following films which were shown on the ninety-fifth annual session motion picture program have been added to the American Dental Association Film Library and are now available to dental societies, study clubs, dental schools, hospital dental staffs, and armed services dental personnel at a nominal rental fee of $2.50.

FILMS RECEIVED

Removal of a Giant Cell Tumor • 16 mm., color, magnetic sound, 18 minutes. Produced in 1954 by the University of Minnesota School of Dentistry. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago. For purchase write to the producer, Minneapolis 14, Minn.

The removal of a central giant cell tumor from the mandible of a 13 year old girl is demonstrated.

Open Reduction of a Fractured Mandible • 16 mm., color, magnetic sound, 10 minutes. Produced in 1954 by the University of Minnesota School of Dentistry. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago. For purchase write to the producer, Minneapolis 14, Minn.

The treatment of a compound fracture of the mandible with overriding fragments by open reduction through an external incision is shown.

Periodontal Surgery • 16 mm., color, magnetic sound, 25 minutes. Produced in 1954 by the University of Minnesota School of Dentistry. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago. For purchase write to the producer, Minneapolis 14, Minn.

A surgical method for the elimination of periodontal pockets is demonstrated.

One print of the following film has been generously deposited by Abbott Laboratories with the Film Library on an indefinite loan basis. If requests from dental societies and other professional groups become too numerous, the borrowers will be referred to Abbott Laboratories. It is suggested, therefore, that requests for this film be made well in advance to assure its availability.

Intravenous Anesthesia with Barbiturates • 16 mm., color, sound, 30 minutes. Produced under the joint sponsorship of the American College of Surgeons and the American Society of Anesthesiologists for the Abbott Laboratories. Technical production by Mervin La Rue, Inc., Chicago. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago and from Abbott Laboratories, Professional Service Dept., North Chicago, Ill.

The principal actions, uses and characteristics of thiobarbiturates are described by means of animated drawings.

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LON W. MORREY, D.D.S., EDITOR

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Editorials

Early reports on new dentifrice promising; let's hope the promise will be fulfilled

The search for an effective, inexpensive and nonobjectionable agent that will prevent dental caries continues to occupy the time and attention of many research workers.

During past months rumors have been heard of a new dentifrice containing stannous fluoride which seems to hold promise. This month, on pages 163 to 166, THE JOURNAL publishes data on the unsupervised use of the dentifrice for one year by four hundred and twenty-three children. The report will be read with interest by dentists and others associated directly or indirectly with the profession because, like countless previous reports on the same subject, it raises hopes that man may at last be released from a painful and most prevalent disease. Whether the promises held forth by this preliminary study will materialize or whether they will fade like similar promises in the past, time alone will tell.

Ever since the profession became seriously interested in the prevention of dental disease, a never-ending series of anticariogenic agents has appeared on the horizon like meteors which have blazed momentarily or longer, then burst and dropped into oblivion. Some thirty years ago the ills of the mouth promised to be detoxified out of existence. Detoxification was eclipsed during the late 1920's by a dentifrice composed of synthetic saliva. Then followed in rapid succession, during the depression days of the thirties, dental creams that made teeth "three shades whiter in three days"; those that had "special film removing" qualities; those that neutralized

acidity by releasing oxygen and lime water; one that corrected "pink tooth brush" and one that removed "seven kinds of stain." There was another highly recommended for "soft teeth" and still another that contained "a strange, gentle almost magical ingredient that cleans the teeth in a new, safe, delightful way."

The hollow caries cures huckstered in the thirties have been silently laid to rest and from their ashes have arisen more scientifically blended preparations—none perfect, but all purporting to reduce the incidence of caries some sixty per cent—those containing chlorophyllin; vitamin D and sodium fluoride; ammonia compounds and antienzymes. All of these dentifrices have come—many have gone, but none has appreciably reduced the incidence of caries. Despite this discouraging history each new claim and each new claimant is received in a spirit of hope—tempered, of course, with understandable misgivings.

It is in this attitude that the profession awaits the definitive answer on the merits of a stannous fluoride-containing dentifrice—an answer that can only be supplied by exhaustive clinical study. It is hoped that commercial interests will adopt this same attitude and not "jump the gun" as they have done so frequently in the past by using data from preliminary research studies as a basis for a nation-wide sales campaign. Perhaps this admonition is unnecessary as the alert dentifrice advertising executive must know that both the profession and the public by now have grown exceedingly gun shy.

The Association Relief Fund—
dissipater of the specters of apprehension

According to the January 15 report of the Council on Relief, $80,782 has been contributed so far to the Association's Relief Fund during the current campaign. $80,782 is a respectable sum yet it is $2,125 less than was contributed by the same date last year and $19,218 less than the $100,000 goal set by the Council. If you have not as yet made your donation this year, or having donated modestly, if you can see your way clear to make a second contribution, please act now in order that the Council's modest goal of $100,000 may be reached at an early date.

The mechanism, need and benefits of the Association's Relief program, now nearly a half century old, are so well known that few members need be urged to participate. For those who are uninformed let it simply be said that every member should contribute to the Fund as every member is a potential beneficiary. No one knows when or whom the cross-winds of adversity may strike. Those who are the givers of today may be among the recipients of tomorrow.

Every dollar contributed not only builds a buffer between the donor and potential financial distress but it helps dissipate the specters that beset the minds of those now destitute, those who are haunted constantly by the specters of insecurity—specters of which the *New York Times*[1] once wrote so feelingly:

As three specters appeared in Charles Dickens' "Christmas Carol," so too do three phantoms haunt the hearts and minds of today's needy. The infirm, aged, homeless and hungry are haunted by the specter of the past. This ghost of reminiscence recalls the better days when vitality and opportunity were in flower and when age and trouble had not taken their toll. This apparition tantalizes the needy with thoughts of what might have been. And when its work is done there comes another specter born of the darkness of despair. This is the ghost of the present, who prowls at every waking hour and even prods the dreams of the weary. It carries a message of importance and speaks quietly of things that will never be. It asks where are the friends to help, and scorns the body that cannot do what the mind is quick to see.

It is this specter that urges the needy to cease their struggle against mounting odds. But they do not heed it, and so are plagued by still another phantom more troublesome and yet more easily influenced—the ghost of the future. It is dreaded most by the needy. It symbolizes uncertainty, for the road of misery and misfortune is seemingly endless. It banishes hope, promises nothing and only mirrors the fact that life will be progressively difficult. But hope is not so easily banished. There is a power within our grasp to dispel this specter completely and to lessen the torments of the other two. . . .

By contributing to the Association's Relief Fund you can grant those opportunities that the needy lack and lighten the burden for your fellow practitioners. Send your contribution today to the Council on Relief, American Dental Association, 222 East Superior Street, Chicago.

1. Editorial, New York Times, Dec. 16, 1952.

Closing of tuberculosis institution milestone in man's fight against disease

The news of the closing of the famous Trudeau Tuberculosis Sanatorium for lack of patients last fall was greeted by the public and the professions as a significant milestone in the age-old war against one of man's most dreaded diseases. Specialists in tuberculosis are quick to point out, however, the closing down of Trudeau must not precipitate a closing down of community effort against tuberculosis—that the discontinuance of this 80 year old institution represents only the passing of a significant milestone and not the attainment of the goal itself. Despite the advances made recently in detection, prevention, therapeutics and surgery which have reduced the tuberculosis death rate sixty-eight per cent in the last ten years, the disease still claims 20,000 lives in the United States annually. Thus even more must be done in the future than has been done in the past to bring the disease under control.

Dentists, by the very nature of their calling, have a keen interest in the nation's tuberculosis problem and rightfully should shoulder more responsibility in the community's efforts to eradicate the disease. Since tuberculosis is a communicable disease and since it is transmitted by the active sufferer to others in the immediate vicinity through such common acts as coughing, sneezing or even heavy breathing, dentists have, or should have, a personal concern in the problem.

Studies made among groups of physicians and nurses indicate that the case rate of such professional people is much above the average of the general public. It is not uncommon for a young nurse or intern to contract clinical tuberculosis traceable to a patient hospitalized for a broken leg or some other long term ailment. Although no comparable studies have been reported recently of groups of general dental practitioners, dentists are constantly exposed to such danger as pointed out by Abbott, Briney and Denaro[1] in their study of tubercle bacilli from the mouth washings of tuberculous dental patients.

The Tuberculosis Institute of Chicago and Cook County reports that the new drugs now being used to treat tuberculosis in some respects offer additional safety to dentists because a greater number of patients suffering from that disease are rendered sputum-negative much faster than prior to the advent of streptomycin, PAS (para-aminosalicylic acid) and isoniazid. There is a growing feeling among tuberculosis specialists, however, that such patients as may be inadequately treated or whose treatment is discontinued too early may, within two or three years, become reactive and sputum-positive. The present safety factor, therefore, has no assurance of long-term duration.

Not only does the dentist have an interest in the tuberculosis problem from the standpoint of his own dependents' health, he has a responsibility in the matter from the standpoint of his patients. Repeated studies have proved that poor nutrition and a low health status are contributing factors in tuberculosis infection. Frequently these same factors are found in patients suffering from severe dental disease. Dentists would be well within their province to suggest to such patients that they obtain a thorough physical examination including a chest roentgenogram.

Dentists can do much in an educational way by advising patients of the continued existence of the tuberculosis infection problem and the advisability of having an annual physical examination including chest roentgenograms. As progress is made in reducing the incidence of tuberculosis, the remaining cases will become harder to detect. These cases will have to be controlled through improved general health and environment so that the body primarily will resist the inroads of infection and secondarily prevent the spread of the disease.

The more the dentist, as one specialist in the field of health, helps other health specialists to educate the public in the detection, prevention and treatment of tuberculosis, the sooner other sanitoriums will become, like Trudeau of the Adirondacks, casualties of medical progress.

1. Abbott, John N.; Briney, Alonzo T., and Denaro, Salvatore A. Recovery of tubercle bacilli from mouth washings of tuberculous dental patients. J.A.D.A. 50:49 Jan. 1955.

Washington News Letter

President Eisenhower's special health message to Congress late in January and his recommendations on budgetary appropriations portend an increased government participation in the economics of health services.

Today thousands of dentists are receiving payment from Washington for care given to veterans. In the not too distant future, they may be giving care to servicemen's dependents. Dental schools are receiving limited amounts of federal aid for support of research and, if present trends continue, the next step may be substantial subsidies principally for the purpose of producing more graduates.

White House pronouncements of recent weeks have clearly demonstrated the President's keen interest in providing more and better medical and dental care to the population. And in Congress, a number of bills have been introduced—sponsored by influential Republicans and Democrats—with the same end in view.

The Administration has renewed its appeal for Congressional passage of federal reinsurance to bulwark voluntary prepayment programs. With an increasing number of these plans adding limited dental care to their coverage contracts, dentistry has more than an academic interest in the outcome of this campaign.

Also being requested are increased appropriations for dental and medical research grants and for dental public health projects.

In legislative matters directly affecting dentistry, however, Congress is expected to give first attention to the President's proposed military personnel program, which involves the doctor-draft law. The President has asked that the law be extended for two more years, until June 30, 1957. In all probability this will be done, although it is likely that the various priorities will be redefined before final enactment.

In the President's budget for 1955-56, submitted to Congress on January 17, a total of $2,136,000 is requested for "dental health activities." This compares with $1,990,000 which was allotted for the current fiscal year, ending June 30, 1955.

The earmarking provides for $421,000 in grants-in-aid, principally to schools of dentistry; $100,000 to finance 23 research fellowships; $764,000 for internal operations of the National Institute of Dental Research; $660,000 for technical aid to the states in dental public health, including fluoridation projects; and the remainder for administrative and miscellaneous expenses.

DENTAL SCHOLARSHIPS

At this writing, the Administration-sponsored bill establishing dental and medical scholarships for young men who agree to serve a specified number of years in the Armed Forces had not yet been introduced in Congress. However, the Department of Defense has disclosed that it will support such a measure this year.

Without waiting for this "official" bill, Representative Charles E. Bennett (D., Fla.) introduced a military scholarship plan on the first day of the 84th Congress January 5. Its provisions are similar to those in the bill which the Pentagon will support, the main difference being that Bennett's requires the student to be a reservist while he is in school while the Pentagon plan has no such requirement.

The Bennett bill specifies that an acceptable candidate for a scholarship shall agree to serve on active duty with Army, Navy or Air Force for three years following completion of training, or for one

year for each school year—or fraction thereof—in which he held a scholarship. All fees, tuition, books and laboratory expenses would be paid for by the government, which would also give the student a $133 monthly subsistence allowance.

A statistical report by the Veterans Administration tends to show that dentistry and the other health sciences are exerting diminishing appeal to war veterans applying for professional training at federal expense.

Proportionately more disabled veterans of the Korean war are applying for professional training, in comparison with those of World War II. Far greater numbers are interested, however, in accounting, teaching and engineering than in the health sciences.

Out of 4,688 Korean veterans who had enrolled for professional education up to a recent date, only 19 of them were in dental schools and only 23 in medical schools.

Representatives Eugene J. Keogh (D., N.Y.) and Thomas A. Jenkins (R., Ohio) have reintroduced identical bills whose purpose is to permit self-employed dentists, lawyers and other professional persons outside of social security coverage to set up voluntary retirement plans with tax-deferment on a portion of their annual income.

Public hearings were held on the bill several years ago, but it did not emerge from the House Ways and Means Committee.

The Keogh-Jenkins bill would allow self-employed individuals to deduct 10 per cent of their earned net income each year, or $7,500—whichever is the lesser figure—but not in excess of $150,000 in a lifetime.

FOOD AND DRUG STUDY

A committee of 14 citizens has been appointed by Secretary Oveta Culp Hobby of the Department of Health, Education and Welfare to study and make recommendations on better enforcement of the nation's pure food and drug laws. Secretary Hobby said:

> Great expansion of the food, drug and cosmetic industries and scientific and technological changes in the methods of processing these commodities have brought with them important changes in the enforcement responsibilities of the Food and Drug Administration.
>
> The extent to which our present enforcement program is effective in protecting the consumer and the amount and kind of enforcement that is necessary to give the maximum amount of protection need to be re-examined. That is the fundamental purpose to which this committee will devote its study.

Scheduled to hold its first meeting in Washington on February 3, the committee consists of the following: G. Cullen Thomas, of Minneapolis, chairman; Miss Catherine Dennis, Raleigh, N. C.; Mrs. Grace Drexler Nicholas, Washington, D. C.; Judge Patrick T. Stone, Wausau, Wis.; Frank W. Abrams, New York City; Harry Dowling, M.D., Chicago; Charles Wesley Dunn, New York City; Robert A. Hardt, Nutley, N. J.; Leonard Maynard, M.D., Ithaca, N. Y.; Lee W. Minton, Philadelphia; Charles F. Poe, Boulder, Colo.; H. N. Riley, Pittsburgh; Walter Silbersack, New York City, and H. Gregory Thomas, New York City.

Association Affairs

DANIEL F. LYNCH HEADS ORAL SURGERY COMMITTEE

Daniel F. Lynch, president of the Association, will head a new committee on problems in the field of oral surgery. Others on the committee are immediate past president Leslie M. FitzGerald of Dubuque, Iowa; James R. Cameron of Philadelphia; Fred A. Henny of Detroit; Paul H. Jeserich of Ann Arbor, Mich., and O. J. McCormack of Syracuse. Bernerd J. Kingsbury of San Francisco, Association president-elect, will serve as consultant to the committee.

ASSOCIATION URGES CUT IN CALL FOR DENTAL OFFICERS

In a letter sent to Frank Berry, M.D., assistant secretary of defense for health and medical affairs, the Association late in December urged the Department of Defense to reduce by at least 200 the newest military call for dentists under the dentist-physician draft law. The draft call was for 459 dental officers to be inducted in April and included for the first time nonveteran Priority III dentists up to the age of 45.

The Association's action came after government officials announced a reduction in Armed Forces strength. The letter, signed by Mr. Bernard J. Conway, newly appointed secretary of the Council on Legislation, said in part, "Since the military dental services use a staffing pattern of approximately two dentists for each 1,000 persons in active military service, a reduction of 108,000 in personnel strength should mean a reduction of about 200 in dental officer strength."

Mr. Conway added, "The Association is seriously concerned with the hardships that will be involved in calling dentists up to the age of 45 into active military service. The Association believes that the Department of Defense may, and should, mitigate the problem by reducing the call upon Selective Service for dentists commensurate with the planned reduction of Armed Forces personnel strength."

Since Mr. Conway's letter, President Eisenhower, in a letter to Secretary of Defense Charles E. Wilson, stated that he would send to Congress a program which contemplated a total Armed Forces' strength of about 3,000,000 men by June 30, 1955, a number higher than the original estimate. Even with the new figure and even if the current ratio of personnel to dentists is maintained some 100 fewer dentists should be needed.

The President also called for extension of the physician-dentist draft law. In his January 13 message to Congress, he asked a four-year continuance of the regular draft act and added, "In the case of doctors (sic) and dentists, I recommend that the extension be for another period of two years only. By that time, it is expected that the medical personnel requirements of the Armed Forces can be met adequately by other means."

The draft call was discussed also in other quarters last month. Leo J. Schoeny, dentist member of the National Advisory Committee to Selective Service, informed the Association that at a January 6 and 7 meeting, the Advisory Committee had decided to restudy draft figures. Dr. Schoeny stated that chairmen of the state advisory committees to selective service had been urged to make a further check for Priority I and II dentists and those younger men in

Priority III who might have escaped previous calls. If sufficient effort is made, Dr. Schoeny said, the call of older men in Priority III might well be avoided.

The question of special draft legislation for dentists also will be the subject of a Pentagon conference February 2 when Association officers meet with Defense Department officials. The Association has gone on record opposing continuation of the special draft law. Representing the Association at the Pentagon conference will be Daniel F. Lynch, president; F. J. Reichmann, chairman of the Council on Federal Dental Services; J. Claude Earnest, vice-chairman of the Council on Legislation, and Bernard J. Conway, Council secretary.

ASSOCIATION TELLS H.E.W. VIEWS ON LEGISLATION

Recommendations for health legislation in the new 84th Congress were discussed at a mid-December conference in Washington, D. C., of Association officials and representatives of the Department of Health, Education and Welfare. Federal officials who conferred with Harold Hillenbrand, Association secretary, and C. Willard Camalier, assistant secretary, included: Mr. Roswell Perkins, assistant secretary of the Department of Health, Education and Welfare; David E. Price, M.D., assistant surgeon general of the U. S. Public Health Service; Walter J. Pelton, chief of the USPHS division of dental resources, and Mr. Allen Pond, assistant to Chester S. Keefer, M.D., special assistant for health and medical affairs of the Department of Health, Education and Welfare.

TWO COUNCILS SPONSOR CONFERENCE ON ANESTHESIA

A conference on local anesthesia in dentistry is being sponsored by the Council on Dental Therapeutics and the Council on Dental Education. The conference, which will consider problems relating to the teaching of local anesthesia in the dental schools, will be held March 20 at the Central Office. Among those attending are members of the two Councils and representatives of the dental schools.

STAFF APPOINTMENTS, PROMOTIONS ANNOUNCED

The appointment of three new members to the Association Central Office staff and the promotion of two others was announced in January by Harold Hillenbrand, secretary. The staff changes are as follows:

Mr. Bernard J. Conway, a member of the Central Office staff since 1949, has accepted appointment as secretary of the Council on Legislation to replace Mr. Francis J. Garvey, who resigned recently. Mr. Conway joined the Association staff after graduation from the Loyola University (Chicago) Law School. He served as legislative assistant to the Council on Legislation until December 1951 when he became its assistant secretary. In January 1953 he became secretary of the Council on Federal Dental Services and the Council on Dental Trade and Laboratory Relations, posts he has held until his recent appointment. Mr. Conway will

B. J. Conway

N. C. Hudson

S. T. Mayo

W. A. Suberg

W. E. Burmeister

continue to supervise staff activities for these two Councils on a temporary basis.

Mr. N. C. Hudson of Chicago has been named to the newly created post of assistant editor. He will work under the direction of Lon W. Morrey, Association editor, in the development of the abstract journal authorized by the House of Delegates at the 95th annual session. The first issue of the new journal is to appear in January 1956. Since 1945, Mr. Hudson has been western editor of *Traffic World*, and since 1948 editor of *Transportation Supply News*, until recently a sister publication of *Traffic World's*. Prior to that he was a contributing columnist to *Amateur Golfer and Sportsman*. He is a graduate of the University of Minnesota.

Mr. Samuel T. Mayo, of Atlanta, Ga., new director of the Division of Educational Measurements of the Council on Dental Education, succeeds Mr. Cletus J. Cummiskey. Mr. Mayo received his M.A. degree from Emory University and currently is working for his doctorate at the University of Minnesota. His graduate work has been in psychology and educational psychology. Mr. Mayo formerly was on the faculty of Emory University and Georgia Institute of Technology. He is a member of the American Psychological Association and the American Statistical Association.

Mr. Walter A. Suberg, assistant business manager since 1950, has been promoted to the new post of associate business manager. Prior to joining the Central Office staff, he was director of purchases for U. S. Sanitary Specialties Corporation in Chicago.

Mr. Wayne E. Burmeister of Peoria, Ill., the new assistant manager, recently completed a tour of duty with the Army Audit Service at Los Angeles. Mr. John J. Hollister continues as Association business manager.

STATE SECRETARIES DISCUSS LABOR DENTAL CARE PLANS

A trend toward organized health care programs is responsible for the demands of labor unions for dental care plans, it was stated at the Seventh State Secretaries' Management Conference held at the Central Office January 17-19. People have learned the importance of good health, including dental health, and the demands for dental care from labor groups cannot be ignored by the dental societies, speakers stated.

Some 60 persons, including representatives from 25 constituent societies and members of the Association Central Office staff, participated in the three day conference.

Problems faced by constituent societies in dealing with labor groups interested in dental care programs were a major topic on the agenda. The experiences of different societies in this area were discussed by a panel consisting of John G. Carr of New Jersey, Paul W. Clopper of Illinois, Robert E. Paulsen of Washington, John G. Rooks of California, Harold E. Tingley of Massachusetts and Charles A. Wilkie of New York. In the discussion which followed, the consensus was that constituent societies, in the interests of public health, should cooperate in the development of dental health programs for unions and community groups. Only through the early participation of the dental societies could organized dentistry be assured that these plans would provide care in a manner consistent with the best interests of the public.

On January 17 Harold Hillenbrand, Association secretary, discussed technics for formulating and carrying out programs for constituent societies, and Harry Lyons, dean of the School of Dentistry of the Medical College of Virginia, discussed problems and relations of constituent societies with the medical profession. The patient could best be served through a health team, said Dr. Lyons, asserting that dentists should seek a further development of the health team concept. Integration of health services, and not their separation, was a desirable aim, he stated.

Problems and relations of constituent societies with dental laboratories, with state law enforcement officials and with dental hygienist and dental assistant groups were discussed at the morning session January 18 by Bernard J. Conway, secretary of the Council on Legislation; John R. Porter, legal counsel of the Chicago Dental Society, and Shailer Peterson, secretary of the Council on Dental Education.

Six men who had attended all seven management conferences were honored at a dinner January 18 at the Kungsholm restaurant. Those honored were Fred Wertheimer of Michigan, Fritz A. Pierson of Nebraska, Paul W. Clopper of Illinois, Ray Cobaugh of Pennsylvania, Kenneth F. Crane of Wisconsin and H. Leon Snow of Michigan. Herbert B. Bain, director of the Bureau of Public Information, was toastmaster.

Lon W. Morrey, Association editor, and Harold Hillenbrand, secretary, alternated as conference chairmen.

COUNCIL ON DENTAL HEALTH MEETING AGENDA ANNOUNCED

Establishment of policies in relation to pending federal legislation, union dental care programs, dental care for the indigent and the chronically ill are on the agenda for the February 20-22 meeting of the Council on Dental Health. The meeting will be held in the Central Office. Also to be considered are plans for participation in a joint conference on federal dental health programs with the Council on Federal Dental Services.

In addition, the Council will discuss Association relations with other national health agencies, appoint the standing and special committees of the Council and elect a vice-chairman. David W. Brock of St. Louis, Council chairman, will preside.

YEAR-END MEMBERSHIP SETS RECORD HIGH

Year-end figures showed a new high in Association membership. The steady upward trend has brought the Association to the point where its membership encompasses eight out of ten practicing dentists in the United States. As of December 31, there were 82,707 members as compared with 80,127 a year ago. Of these, 72,784 were fully privileged, 9,697 were students, 197 affiliate, 17 associate and 12 honorary. All categories of membership showed increases over the previous year.

The Navy and 46 constituent societies registered gains; one society's total remained the same and seven societies, the Air Force, Army, U. S. Public Health Service and Veterans Administration showed losses.

Leading the way in the number of new members was Southern California with an increase over last year of 208. Others with sizable gains were Michigan, New Jersey, New Hampshire, New York, North Dakota, Tennessee and the Navy.

SAN FRANCISCO SESSION TO SEAT 416 DELEGATES

Constituent societies will send 416 delegates to the Association's 96th annual session in San Francisco next October, Louis M. Cruttenden, assistant secretary, has announced. There were 403 at the Miami meeting. The number of delegates to which a society is entitled is based on the number of its fully privileged members. Each of the federal services is entitled to one delegate.

In addition to the 416 voting delegates, approximately 90 other individuals will be privileged to sit but not vote in the House, Dr. Cruttenden states. Thus some 506 persons will be admitted to the floor of the House this year. Included among the 90 nonvoting participants are the officers and trustees of the Association, chairmen of the councils and special committees, secretaries of the councils, past presidents, Central Office staff and executive secretaries of state dental societies.

EDUCATION COUNCIL TO HOLD DENTAL HYGIENE WORKSHOP

The Council on Dental Education will sponsor the third Workshop on Dental Hygiene in Chicago March 23 and 24. The conference will follow the half-day session on dental hygiene that is being held in connection with the meeting of the American Association of Dental Schools.

Under discussion will be the curriculum of the dental hygiene schools with special emphasis placed on course content and on the methods that can be used for evaluating student progress in these courses.

In a letter sent to directors and supervisors of dental hygiene programs and to deans of the dental schools, Shailer Peterson, secretary of the Council on Dental Education, urged participation of all those interested in dental hygiene education whether or not their schools now have programs and stated, "It is hoped that this conference may lead to a better understanding of the specific aims and objectives of each course and ultimately perhaps to a nation-wide program of the dental hygiene schools for evaluating their students."

SANDELL SERVES ON BOOK REVISION COMMITTEE

Perry Sandell, director of the Association Bureau of Dental Health Education, will represent the Association on a committee to revise the book *Suggested School Health Policies*. The publication, known as the "bible" of school health programs, contains general policies for planning as well as recommendations on the specific areas of school health programs.

CONFERENCE PLANNING GUIDE MAILED TO SOCIETIES

A Guide for Planning Dental Health Conferences, published by the Bureau of Dental Health Education, will be mailed to secretaries of constituent and component societies in February. The booklet discusses such matters as the reasons for a dental health conference, preconference planning and the organization of the conference itself. It tells how to train a con-

Association president Daniel F. Lynch observes the examination of a Navy recruit at the U. S. Naval Training Center in Bainbridge, Md., where he recently addressed a meeting of dental officers.

ference leadership team. In order to illustrate the general principles explained, the *Guide* includes a step-by-step account of a recent Rochester, New York, Dental Society dental health education conference, from the original decision to hold the conference, through publicity and program planning, to a final evaluation of conference results.

RELIEF FUND REACHES $80,781 WITH 14 GROUPS AT QUOTA

Five additional state societies exceeded their quotas in the current Relief Fund drive, making a total of 14 groups which had reached or exceeded their quotas as of January 11. The total was some $2,000 behind last year's figure. Latest states to top the 100 per cent mark were North Dakota, Southern California, Iowa, Nebraska and Washington.

The smaller societies continued their lead over the larger societies. Among individual societies, Alaska maintained a 33 point lead over Tennessee with 263 per cent of quota. Memorial gifts totaled $856. Contributions from constituent societies as of January 11 were:

Quota over $925

1954-55

	Quota	Contributions to January 11	Pct.
California	$ 3,820.00	$ 3,420.50	89.5
So. California	4,580.00	5,308.00	115.9
Colorado	960.00	735.00	76.6
Connecticut	1,940.00	1,583.50	81.6
Florida	1,380.00	1,179.50	85.5
Georgia	1,020.00	860.00	84.3
Illinois	7,240.00	6,227.56	86.0
Indiana	2,340.00	2,082.00	89.0
Iowa	1,780.00	1,849.00	103.9
Kansas	960.00	729.65	76.0
Kentucky	1,130.00	764.50	67.7
Louisiana	1,020.00	850.50	83.4
Maryland	1,060.00	958.00	90.4
Massachusetts	3,690.00	1,584.50	42.9
Michigan	4,100.00	3,578.15	87.3
Minnesota	2,840.00	2,495.55	87.9
Missouri	2,450.00	2,154.50	87.9
Nebraska	1,060.00	1,065.00	100.5
New Jersey	4,020.00	3,626.50	90.2
New York	15,200.00	8,719.50	57.4
N. Carolina	1,240.00	673.00	54.3
Ohio	4,920.00	3,630.25	73.8
Oregon	1,230.00	1,092.00	88.8
Pennsylvania	6,810.00	4,537.75	66.6
Tennessee	1,310.00	3,020.00	230.5
Texas	3,190.00	1,992.50	62.5
Virginia	1,150.00	993.50	86.4
Washington	1,800.00	1,845.00	102.5
Wisconsin	2,930.00	1,811.50	61.8
Total	$87,170.00	$69,366.91	79.6

Quota of $925 or less

1954-55

	Quota	Contributions to January 11	Pct.
Air Force	$ 600.00	$ 293.25	48.9
Alabama	800.00	1,258.00	157.3
Alaska	60.00	158.00	263.3
Arizona	300.00	99.00	33.0
Arkansas	560.00	525.50	93.8
Army	580.00	434.50	74.9
Delaware	150.00	144.00	96.0
Dist. of Col.	830.00	712.00	85.8
Hawaii	350.00	522.00	149.1
Idaho	260.00	298.50	114.8
Maine	460.00	274.00	59.6
Mississippi	530.00	423.00	79.8
Montana	370.00	459.00	124.1
Navy	920.00	393.50	42.8
Nevada	100.00	103.00	103.0
N. Hampshire	300.00	208.00	69.3
New Mexico	240.00	207.50	86.5

North Dakota ..	330.00	483.55	146.5
Oklahoma	920.00	828.00	90.0
Panama C. Z...	10.00	10.00	100.0
P. Health Serv. .	210.00	248.00	118.1
Puerto Rico ...	190.00	123.50	65.0
Rhode Island ..	560.00	394.00	70.4
S. Carolina	450.00	219.50	48.8
South Dakota ..	350.00	107.00	30.6
Utah	470.00	441.50	93.9
Vermont	200.00	133.00	66.5
Vet. Admin. ...	810.00	278.00	34.3
West Virginia ..	760.00	645.50	84.9
Wyoming	160.00	134.50	84.1
Total	$12,830.00	$10,558.80	82.3

OBSERVANCE OF HEALTH WEEK TO BE LARGEST EVER

Observance of National Children's Dental Health Week, February 7-13, is expected to be the largest in the seven year history of the event. In addition to the portfolios of publicity and promotional material sent out by the Association's Bureau of Public Information, well over 300,000 posters bearing a dental health message have been mailed to participating societies. Reports received thus far indicate that radio and television programs will play a prominent part in the observance of the 1955 event.

SPECIALTY GROUPS INVITED TO COUNCIL CONFERENCE

Two representatives from each of the seven specialty boards that now have their requirements approved by the Council on Dental Education as well as representatives from groups seeking recognition have been invited to attend the second Workshop on Dental Specialties sponsored by the Council February 7 and 8 in Chicago. Shailer Peterson, Council secretary, has requested that other persons concerned with specialty problems who wish to attend the meeting register in advance so that space and materials will be available.

A moratorium on specialty board applications was announced by the Council in February 1954, and the Workshop is expected to help solve certain problems relating to specialties so that applications for specialty recognition can again be considered.

Among the questions to be discussed at the conference will be the ways in which specialty boards serve the public interest, what constitutes "over-specialization" in the profession, what criteria shall be used to evaluate specialty training and what systems are in use by the boards for the maintenance of records on applicants and diplomates.

DENTAL EDUCATION CONGRESS CONVENES FEBRUARY 5

The Eleventh Congress on Dental Education and Licensure will convene February 5 at the Conrad Hilton Hotel in Chicago. The Congress, which is sponsored by the Association Council on Dental Education, will consider problems of accreditation and questions arising in the field of dental specialties.

REPRINT SURVEY OF FORMER ARMED FORCES DENTAL MEN

A reprint of a survey of former Armed Forces dental officers has been prepared by the Bureau of Economic Research and Statistics. The survey first appeared in THE JOURNAL in November 1954. Designed to find out what could be done to make careers in the Army, Navy and Air Force more attractive, the survey polled dentists who had completed tours of duty since January 1950.

Information is compiled on the evaluations made by these men of the various aspects of dentistry in the Armed Forces. Copies of the reprint may be obtained from the Bureau of Economic Research and Statistics at the Central Office, 222 E. Superior St., Chicago 11.

Dental Societies

UNION DENTAL CARE PROGRAM BEGINS IN WASHINGTON

Children of longshoremen in the State of Washington have begun signing up for dental care under a program financed by the welfare fund of the International Longshoremen and Warehousemen's Union and the Pacific Maritime Association. The sign-up period began December 27 in Seattle and February 1 in other port areas, according to the Washington State Dental Association. In one area the sign-up begins March 1.

As in California, where the pilot program got under way some months earlier, dental care, exclusive of orthodontic treatment, is provided for children of union members up to age 15. The Washington program provides that patients may choose care under an insured plan, which pays up to $95 for dental care during the year, or may choose to be covered under a service program of the Washington State Dental Service Corporation, which has state dental society members as trustees and officers.

The Corporation will provide dental care on an open panel basis, and a survey taken by the Dental Association shows the majority of dentists willing to contract with the Corporation. A preliminary sign-up indicates that a vast majority of those eligible for care will choose the service plan, William P. Brust, president of the Corporation trustees, stated.

Fred Shandley, president of the Washington State Dental Association, joined with Dr. Brust in praising the cooperation received from the ILWU-PMA Welfare Fund trustees. "Their prime interest was in securing adequate dental care," Dr. Shandley said, "and they left details as to fees, quality of care, and administration in the hands of the dental profession . . . only asking the profession to assure them that the dental needs of their children would be taken care of."

SOCIETY COMMEMORATES GRAND RAPIDS CARIES STUDY

The termination of the ten year Grand Rapids fluoridation study will be commemorated at a meeting of the Detroit District Dental Society in Detroit February 2. In addition, two men, leaders in the development of the caries-preventive measure, will be honored. Tribute will be paid to Frederick S. McKay of Colorado Springs, Colo., for his contributions to early basic knowledge of fluoridation and to William L. Hutton, M.D., medical officer of health of Brant County, Brantford, Ontario. Dr. Hutton was one of the first medical directors to have recommended adoption of fluoridation. The meeting is being held in conjunction with the Society's observance of Children's Dental Health Week.

On the program will be Philip Jay of the University of Michigan School of Dentistry; H. Trendley Dean, secretary of the American Dental Association Council on Dental Research, and Thomas Parron, M.D., dean of the graduate school of public health of the University of Pittsburgh.

CONNECTICUT DENTISTS HELP OUTLINE HEALTH PROGRAM

The Connecticut State Dental Association, through its membership on the Connecticut Advisory School Health Council, has helped to outline dental health recommendations for the schools in the state. The Advisory Council was established in early 1954 by the state commissioner of health and the commissioner of education to establish liaison between the health professions and education authorities. It is composed of representatives of various state organizations interested in health matters.

Work of the Dental Association bore

fruit recently when a letter signed by the commissioners of health and education was sent all school superintendents outlining to them recommendations for a dental program for the schools. The commissioners urged "serious consideration for action" on the proposals and suggested that topical fluoride programs be instituted, that children be allowed time off during school hours for dental appointments and that sale of candy and carbonated beverages on school premises be prohibited. In addition, the letter suggested that a study be made of dental needs in the communities and that a dental health education program be undertaken.

The Connecticut Advisory School Health Council plans a follow-up at a later date to see how well the recommendations are carried out. Representing dentistry on the Council are Irving L. Maislen of West Hartford and Leonard F. Menczer of Hartford, Conn.

ESSAY TOPICS TOLD FOR WISCONSIN MEETING

Radioisotopes and atomic energy in medicine and dentistry, recent advances in the diagnosis and treatment of cancer and dentistry's position in Blue Cross-Blue Shield plans are among the essay topics on the program for the annual meeting of the Wisconsin State Dental Society April 25-27 in Milwaukee. In addition to the essay program, the meeting features table clinics and exhibits.

TWO POSTPAYMENT PLANS LEND 17 MILLION FOR DENTAL CARE

Two West Coast postpayment plans have lent more than 17 million dollars to finance dental treatment, it was reported recently. The Los Angeles County Dental Society plan, which started in October 1950, has now passed the 10 million dollar mark, according to S. Mayo Silverman, chairman of the Society's board of governors. The California State Dental Association's plan, begun in mid-1951, has financed more than 7 million dollars, announced Charles M. Silk, chairman of the postpayment plan committee. In 1955 both plans will reduce from five to four per cent that portion of the bill withheld from the individual dentist to cover losses.

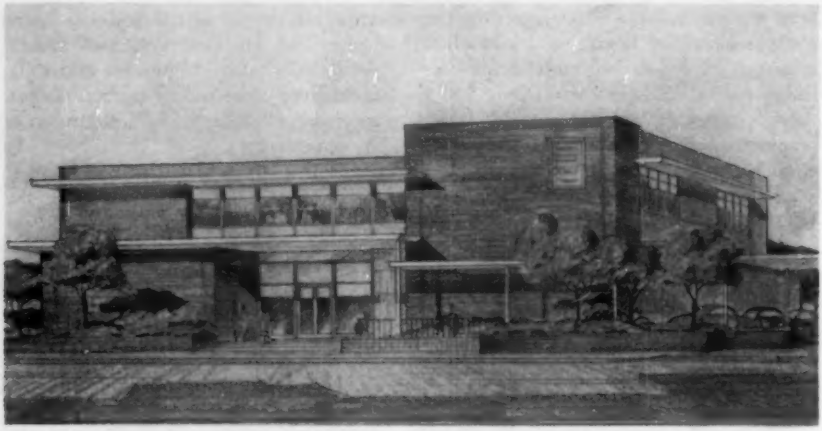
PUBLISH HISTORY OF DENTISTRY IN OKLAHOMA

The History of Dentistry in Oklahoma, From Territorial Days to Present, a book written by J. Stanley Clark, Ph.D., a professional historian, under the auspices of the Oklahoma State Dental Association, will be ready for distribution around March 1. Written in narrative form, the book outlines the development of dentistry in Oklahoma as revealed from historical files, old newspapers, manuscripts and personal interviews. ***The History of Dentistry in Oklahoma*** is one of 25 books chosen for 1954-55 publication by the University Press, University of Oklahoma. Advance orders may be sent to Sumner A. Russman, 809 Medical Arts Building, Oklahoma City, Okla.

CALIFORNIA SOCIETY PLANS DENTAL HEALTH INSTITUTE

Plans for a Southern California Institute of Dental Health are under consideration by the Council on Dental Health of the Southern California State Dental Association, it was revealed recently by A. E. Saunders, chairman of a special committee of the Council.

Tentative plans call for the construction of a two-story modernistic building which would house facilities for teaching dental health to teachers, parents and children throughout the Southern California area. Floor plans and an architectural rendering of the proposed building



An architectural rendering of a proposed building for a Southern California Institute of Dental Health now under consideration by the Council on Dental Health of the Southern California State Dental Association.

have been prepared for consideration by the Council.

One feature of the Institute would be the training of teachers of public and parochial schools in a specially-constructed classroom. This room would be fitted with an observation room for demonstration purposes.

Construction and development of the Institute will depend upon final approval by the Southern California State Dental Association.

Dental Education

DENTAL SCHOOLS ASSOCIATION ANNOUNCES MARCH MEETING

Research grants and fellowships, the teaching of crown and bridge prosthodontics and the physician-dentist draft act as it affects the schools are among topics to be discussed at the thirty-second annual meeting of the American Association of Dental Schools March 20-23 at the Morrison Hotel, Chicago. In addition to the general sessions, conferences will be held on the teaching of various aspects of dentistry, including orthodontics, pathology, dental materials and roentgenology. A conference session on teacher training and one on dental hygiene education are planned also. One session will be held jointly with the International Association for Dental Research.

The teaching of prosthodontics will be discussed by eight essayists, with Stanley D. Tylman of the University of Illinois presiding. Leo J. Schoeny, dentist member of the Health Resources Advisory Committee of the Office of Defense Mobilization, will analyze possible changes in the physician-dentist draft act and student deferments at the deans' breakfast March 22.

A review of research grants and fellowships will be conducted by representatives of granting agencies, school administrators and others concerned with the handling of grants. H. Trendley Dean, secretary of the American Dental Association Council on Dental Research, will preside.

SCHOOL INSTITUTES PROGRAM OF CARE FOR HANDICAPPED

A program of dental care for mentally and physically handicapped children has begun at the College of Physicians and Surgeons, A School of Dentistry, in San Francisco. The purpose of the program is twofold, the school states: to provide care for the children and to provide training for the dentist so that more dentists will be able to render this type of dental service. The team is composed of Charles Wycoff, anesthesiologist, John Tocchini, dean of the school, a registered nurse and a senior student.

HOWARD UNIVERSITY OPENS NEW DENTAL SCHOOL BUILDING

A new three million dollar College of Dentistry building, designed to accommodate 400 students, opened at Howard University in Washington, D. C., January 5. Russell A. Dixon, dean of the dental school, announced that the new building would make possible an expansion of enrollment from the present 205 students in the dental school to 320. The dental hygiene program, presently enrolling 17 students, will have facilities for 80.

The new building is a three-story reinforced concrete and brick structure with a floor area of 69,000 square feet. Among the features of the dental building are four preclinical laboratories, a general clinic, classrooms, a library with a 30,000 volume capacity, a cafeteria and a student lounge.

SCHOLARSHIPS AVAILABLE FOR MEDICAL LIBRARY WORK

Four scholarships of $150 each for summer school courses in medical library work are being offered by the Medical Library Association. Two of the scholarships are available for the medical library course at Columbia University July 5 to August 12. Two are for Emory University, July 18 to August 20.

Application for a scholarship should be made directly to the school the candidate wishes to attend and should be accompanied by a transcript of the candidate's academic record. The candidate must be approved before the April 1 scholarship deadline date. Completion of either course enables a student with a B.A. degree and one year's library school training to qualify for Grade I certification by the Medical Library Association.

Information about the courses may be obtained from the dean of the School of Library Service, Columbia University, New York, and from the director of the division of librarianship, Emory University, Atlanta, Ga.

Howard University in Washington, D. C., opened its new College of Dentistry building in January.

SCHOOLS OFFER INTERNSHIPS IN ORAL SURGERY

A one year internship in oral surgery beginning July 1, 1955, is offered by the University of Illinois Research and Educational Hospitals in Chicago. A minimal stipend is provided as well as residence at the hospital with room, board, laundry and uniforms. Emphasis will be placed on the practical aspects of oral surgery for both inpatient and outpatient services. Inquiries may be addressed to D. J. Caseley, M.D., medical director, University of Illinois Research and Educational Hospitals, 840 S. Wood St., Chicago.

In addition, ten fellowships with stipends of $1,800 to $2,400 are being offered medical and dental graduates by the University of Illinois Professional Colleges. The fellowships will be awarded to qualified scholars interested in academic or research careers in the medical and allied sciences. Applications must be received by March 1, the University has announced, and the awards will be made by April 1. Applications may be sent to the associate dean of the Graduate College, University of Illinois Professional Colleges, 808 S. Wood St., Chicago 12.

At the University of Louisville School of Dentistry an internship and a residency in oral surgery are being offered in cooperation with the Louisville and Jefferson County Board of Health. The intern will spend four months in the department of anesthesiology of Louisville General Hospital where he will administer anesthesia for both major and minor surgery as well as dental anesthesia. In addition, he will enroll in the School of Medicine for a graduate course in pathology. The intern will act as first assistant on selected major surgery cases and may perform minor oral surgery.

The resident is directly responsible for the management of the oral surgery clinic and will assist in teaching exodontics to junior dental students. The stipend for the intern is $70 a month, for the resident, $170. Selection of the successful candidates will be made in February. Both the internship and residency begin in July.

NORTHWESTERN TO BUILD DENTAL SCHOOL CLINICS

Construction of two dental school clinics, one for oral surgery and one for diagnosis, treatment planning and research, will get under way in March at the Northwestern University Dental School's Chicago campus. The oral surgery clinic is especially designed for work with handicapped children, announced George W. Teuscher, dean of the dental school. Additional operating rooms, treatment rooms, a medical laboratory and several sterilization areas are provided by the new facilities.

DENTAL SCHOOLS PLAN GRADUATE PROGRAMS

Indiana • Indiana University School of Dentistry is offering a course in crown and bridge laboratory technic for dental technicians. The dates of the program are Wednesday afternoons and evenings, February 16-23, March 2, 9, 16, 30 and April 13. Included in the course will be the construction of bridges by class members using both the hydrocolloid technic and the die transfer technic.

In addition the school presents a crown and bridge symposium April 6. Participating will be J. William Adams, Ralph McDonald, Roland Dykema, John F. Johnston and Dean Maynard K. Hine of the school faculty, and Francis Vedder of the University of Michigan School of Dentistry.

Loyola • Applied anatomy will be taught by Harry Sicher, M.D., March 24-26 at Loyola University School of Dentistry in

Chicago. The lectures will be given at the cadaver while the respective region is being dissected. Various regions of the face and neck will be discussed. Attendance is limited to ten. Further information may be obtained from F. M. Wentz, director of the postgraduate division at the school.

Pennsylvania • The School of Dentistry of the University of Pennsylvania in Philadelphia announces five postgraduate courses: complete denture prosthesis, March 7-12 and March 28 to April 2; oral surgery and anesthesia, March 14-19; clinical application of the principles of crown and bridge service, April 11-16, and endodontics April 18-29.

Pittsburgh • The graduate school of the University of Pittsburgh School of Dentistry has announced that selection of students for graduate courses in oral surgery, orthodontics, pedodontics, periodontics, prosthodontics and anesthesia will be made in March. Students for the postgraduate, full-time, one year course in general anesthesia for oral surgery will be considered at the same time. Further information may be obtained from the director of graduate study.

Toronto • Applications for a graduate course in orthodontics will be received up to March 1, the Faculty of Dentistry of the University of Toronto has announced. The course begins September 1 and continues for two academic years. Enrollment is limited to four graduates of approved dental schools. Application blanks may be obtained from the dean of the Faculty of Dentistry, University of Toronto, Toronto, Ontario, Canada.

In addition, the school has scheduled five graduate courses for the coming months: endodontics, March 7-11; orthodontics for the general practitioner, March 28 to April 1; orthodontics for the specialist, April 11-15; periodontics, April 25-29, and dental oral surgery and anesthesia, May 2-6.

Tufts • Complete denture implants will be taught April 25-29 by Tufts College Dental School in Boston. The history, theory, design, technic, indications and contraindications of complete denture implants will be discussed. Norman I. Goldberg and Aaron Gershkoff will teach.

Washington (Seattle) • The role of the general practitioner in the early detection, diagnosis and control of cancer will be discussed in a dental refresher course entitled "Cancer of the Oral Region" March 22 and 23 at the University of Washington School of Dentistry in Seattle. The course is being given in cooperation with the Washington division of the American Cancer Society. Lectures will be illustrated by slides; the program will conclude with a panel discussion. There is no tuition fee for Washington dentists.

INCREASED ENROLLMENT IN DENTAL SCHOOLS REPORTED

Total enrollment in the nation's dental schools continued its upward climb this year with 14,971 students registered as of October 15. The *Dental Students' Register* for 1954-55 shows that this year there are 12,601 undergraduate dental students as compared with 12,516 last year. There are 1,103 graduate and postgraduate students. As of October 15, there were 3,084 dental school graduates, also a record high. Enrollment in the dental hygiene schools increased as well with 1,938 students registered. Last year there were 1,794.

The *Dental Students' Register*, available from the Association's Council on Dental Education at the Central Office, in addition to statistics on the total number of students, contains information on

such items as the number of students coming from different regions of the country, the amount of predental training which they have and admission requirements of the dental and dental hygiene schools.

COURSE IN ORAL PATHOLOGY AT ARMED FORCES INSTITUTE

A course in pathology of the oral regions open to both civilians and military personnel is being offered by the dental and oral pathology branch of the Armed Forces Institute of Pathology March 14-18 in the branch's new building at Walter Reed Army Medical Center, Washington, D. C. The course will cover the pathology of bone, mucous membrane, the periodontium, dental pulp and the temporomandibular joint. There is no fee for the program, and those persons interested in applying are urged to write to Col. Joseph L. Bernier, chief of the dental and oral pathology branch.

REPORT DEATH OF GLENN PELL, INDIANA FACULTY MEMBER

Glenn J. Pell, outstanding oral surgeon and professor of oral surgery at the Indiana University School of Dentistry, died December 7 at his home in Indianapolis. He was 68 years old. Dr. Pell had been on the faculty of the Indiana Dental College and the Indiana University School of Dentistry since 1916 and continued his practice of oral surgery until his death.

In addition to his work as a teacher, Dr. Pell is known for his contributions to procedures in oral surgery.

Dr. Pell was elected president of the American Society of Oral Surgeons in 1947. In 1949 he was appointed to the advisory board of the American Board of Oral Surgeons. He helped to organize the Indiana Society of Oral Surgeons and was made its first president in 1950.

NORTH CAROLINA SCHOOL TRAINS DENTAL ASSISTANTS

More than 100 girls are now enrolled in a dental assistants' training program offered by the University of North Carolina extension division, reports John C. Brauer, dean of the North Carolina School of Dentistry. Designed to meet the need for trained dental assistants, the course satisfies the educational requirements for the Certification Examination of the American Dental Assistants Association.

The correspondence course was developed by a committee of the North Carolina Dental Society and faculty members of the School of Dentistry. It was approved by the American Dental Assistants Association at the group's recent meeting in Miami.

Public Health

FACTS ON KINGSTON-NEWBURGH ANSWER ANTIFLUORIDATIONISTS

The misuse by antifluoridationists of statistics from Newburgh and Kingston, N. Y., has brought an answer from the New York State Department of Education. The antifluoridationists had claimed that figures submitted by local school officials to the Department of Education showed more dental defects among the Newburgh children than among Kingston children. Newburgh fluoridates its water supply.

In a letter signed by John A. Forst, M.D., the Department of Education points out that different procedures are used in the making of dental examinations in the two towns and that the type of reporting of dental defects used by the education department is different from that used by the State Department of Health in its Newburgh-Kingston Caries Fluoride Study. For these reasons,

the statistics of the two departments cannot be compared.

In Kingston, the letter points out, oral inspections are made by the school physician, usually by the open mouth, tongue blade method. In Newburgh, a dental hygienist makes a careful examination by the use of mouth mirror and explorer, inspecting each tooth for defects. In addition, reports received by the education department indicate the number of children with some oral defect but not the number of defects per child nor the type of defect present. Thus, the reports make no differentiation between such defects as malocclusion, caries or gingivitis. These factors, the letter states, "make comparison impossible between the data collected and reported by this Department and those reported by the State Department of Health."

COUNCIL COMMITTEE DELAYS CHICAGO FLUORIDATION

Fluoridation of Chicago's water supply was set back another three to four months January 10 when a City Council subcommittee rejected two contracts for the chemicals necessary to the caries-preventive measure. Bids to supply the chemicals were made in 1954 but were not acted on by the subcommittee. According to a ruling by the corporation counsel, these 1954 bids may not be acted on in 1955 and new contracts must be submitted. Funds for fluoridation were included in the city budget approved December 31.

REDUCTION OF CARIES SHOWN IN SHEBOYGAN REPORT

Results of the recent dental survey of 2,500 school children in Sheboygan, Wis., confirm the experience of other cities with fluoridation programs. In Sheboygan, where the health measure has been in effect for eight and a half years, comparison of the present dental caries rate with that of the prefluoridation period shows the following: in five to six year olds, the present def of 1.68 is a reduction of 65 per cent over prefluoridation days. Fifty-seven per cent of the present kindergarten children have never had dental caries. In the nine to ten year age group, the DMF is now 1.6, a reduction of 46 per cent. In the 12, 13 and 14 year age group, a DMF of 5.06 is a reduction of 40 per cent.

USPHS AWARDS $84,074 FOR DENTAL RESEARCH

The U. S. Public Health Service has announced approval of $84,074 for dental research projects. The awards, administered by the National Institute of Dental Research, will be used to continue three existing projects and to start eight new ones. The grant to dentistry represents 0.8 per cent of the total grants approved.

USPHS ANNOUNCES PART-TIME FELLOWSHIP PROGRAM

A new federal program of financial aid to students interested in medical or dental research has been announced by the U. S. Public Health Service. Designed to give students an opportunity to explore the research field as assistants to experienced research workers, the program makes available to the medical and dental schools part-time research fellowships of $400 each plus eight per cent added for overhead expenses.

Any approved dental school may apply for two research fellowships. Selection of the fellows will be the decision of the school, whose sole obligation is to report at the end of the year the name of the student, amount of funds expended and a brief report of the research conducted. To date, four dental schools have applied for the fellowship stipends. Requests for applications should be made to the chief

of the Research Fellowship Branch, Division of Research Grants, National Institutes of Health, Bethesda 14, Md.

RESOLUTION URGES RESEARCH ON PERIODONTAL DISEASE

A resolution urging increased research into periodontal disease was passed at the annual meeting of the American Public Health Association in October. Pointing out that "some form of periodontal disease affects the community as a whole" and that "injurious effects in remote areas of the body may result from periodontal disease more frequently than from other forms of oral disease," the resolution calls on the schools and other groups interested in research to step up their studies. Control of periodontal disease is the next major activity of dental public health, the resolution states.

Research

I.A.D.R. MARCH MEETING TO HEAR MORE THAN 200 REPORTS

More than 200 illustrated ten minute reports on new discoveries in all fields of dental research will be presented at the March 18-20 meeting of the International Association for Dental Research, according to George C. Paffenbarger, I.A.D.R. president and chief of the American Dental Association research staff at the National Bureau of Standards. The meeting will be held at the Morrison Hotel in Chicago.

Of special interest to general practitioners, Dr. Paffenbarger states, will be the reports of the Dental Materials Group on latest developments in restorative materials and technics. In addition to the reports of the Dental Materials Group, papers will be given in the sections on fluorides and dentifrices, anatomy and surgery, microbiology, dental caries, periodontal disease, growth and metabolism and histochemistry and enzymes.

For the first time printed abstracts of all reports will be available in advance of the meeting, Dr. Paffenbarger announces. The abstracts may be obtained by those who register prior to February 15, he states. The registration fee of two dollars should be mailed to Dan Y. Burrill, assistant secretary-treasurer, 129 E. Broadway, Louisville 2, Ky. Undergraduate dental students and families of registrants will be admitted to the meetings as guests without payment of the registration fee.

An additional feature of the meeting will be an address by Harold C. Urey, noted physicist, at the combined evening sessions of the I.A.D.R. and the American Association of Dental Schools March 20. Dr. Urey will speak on "The Origin of the Universe."

Frank J. Orland, director of Zoller Memorial Dental Clinic, is chairman of the local arrangements committee.

S. NARROD, ENZYMOLOGIST, JOINS RESEARCH STAFF

Stuart Narrod, Ph.D., of Chicago, an enzymologist, has been appointed to the Association research fellowship staff at the National Institute of Dental Research. He is the fourth Association fellow on the Institute staff. It is expected that Dr. Narrod, who received his Ph.D. from the University of Chicago, will be engaged in the study of the cytology of the soft tissues, work basic to the study of periodontal disease.

The film "Hazards of Dental Radiography," produced cooperatively by the National Bureau of Standards and the American Dental Association Council on Dental Research, won a second prize in the medical category at the International Exhibition of Cinematographic Art in Venice, Italy, in July. The prize is second from the right. Shown at a Washington Film Council luncheon held in January are (l. to r.): Mr. John V. Waller, president of the Washington Film Council; Col. Willard Webb, U.S. representative to the 1954 Edinburgh Film Festival; Mr. Andrew W. Smith, Jr., U. S. representative to the 1954 Venice Film Festival; William T. Sweeney, chief of the dental research section of the National Bureau of Standards; Mr. Warren P. Richardson, motion picture producer, National Bureau of Standards, and George C. Peffenberger, senior research associate of the American Dental Association at the National Bureau of Standards. The script for the film was written by Robert J. Nelsen, Association Research Fellow at the NBS.

BUREAU OF STANDARDS HOST TO VISITORS FROM ABROAD

The dental research section of the National Bureau of Standards played host to visitors from all the continents in recent months. Among the countries represented were England, France, Argentina, Japan, Australia and the Union of South Africa. Guests included A. M. Horsnell, dental dean of the London Hospital Medical College, London; Louis Houpert, of the faculty of medicine and stomatology and dean of the dental school in Nancy, France; Rudolf Lundstam, supervisor of dental care, Frösön, Sweden, and Kurt Hiklerström, assistant professor of the Royal Dental School, Stockholm, Sweden.

Also visiting the National Bureau of Standards were C. C. Van Der Merwe, South Africa Bureau of Standards, Victoria, Union of South Africa; Saul A. M. Nicolussi of Famora, Argentina; Victor Daniels, dentist in charge of preventive dentistry, department of odontology, Santiago, Chile; Genkichi Hara, Ministry of Education, Japan, and George D. Marks, Melbourne, Australia.

International

AMERICANS INVITED TO PARAGUAYAN DENTAL WEEK

American dentists are invited to attend the Second National Dental Week to be presented March 9-12 by the Dental Association of Paraguay. The Paraguayan Association has announced that leading dentists from various countries have accepted invitations to participate in the

program. Additional information may be obtained from the Circulo de Odontologos del Paraguay, Casilla de Correo 565, Asuncion, Paraguay.

LABORATORY COOPERATIVE ORGANIZED IN ARGENTINA

The organization of a cooperative composed of dentists whose purpose is the development of a prosthetic laboratory has been reported by Ricardo Crespi, THE JOURNAL'S correspondent.

The laboratory will be directed by dentists and will employ dental mechanics to make prosthetic appliances. Similar organizations have been operating in Rosario de Santa Fé, a city in the interior of Argentina, and in the city of Córdoba, Dr. Crespi.

Dr. Crespi writes also that the Argentine government is sponsoring a pension law for professional men, including dentists, and that the dental profession has expressed its views to the government and hopes for favorable results.

PROBLEMS OF DENTISTRY TO BE DISCUSSED BY F.D.I.

Hospital dental services, dental education and the dental services of the armed forces of various countries will be on the agenda of the August 14-20 annual meeting of the Fédération Dentaire Internationale. The meeting is scheduled for Copenhagen, Denmark. In addition to the general assemblies of delegates from the national member associations, the F.D.I. councils and commissions will meet. An extensive scientific program of films, lectures and panel discussions is planned as well as a special workshop of experts in periodontology.

Registration before May 1 will be at normal fees, W. Riis Klausen, secretary of the organizing committee, has announced. After the May 1 date, registration will be at a higher rate. Further information on the meeting and on hotel reservations can be obtained from Dr. Klausen, 1, Alhambravej, Copenhagen V, Denmark.

AUSTRALIAN DENTAL SOCIETY ELECTS 1955 OFFICERS

At a meeting held November 23, the Australian Dental Association, New South Wales Branch, elected the following honorary officers: A. G. Rowell, president; W. A. Grainger, vice-president; R. C. Norton, vice-president, and J. G. Fletcher, honorary treasurer. Elected to the executive board were: A. G. Rowell, W. A. Grainger, J. G. Fletcher, G. E. Baulman, T. Royse-Smith, N. E. Edney, R. Krauss, R. C. Y. Norton, E. J. Gee, P. B. Green, A. G. Hunter, F. E. Helmore, G. A. Lonsdale, H. McD. Finnie, A. W. Bull and R. Setright.

National Defense

MEDICAL DIGEST DESCRIBES AIR FORCE DENTISTRY

The December 1954 issue of the U. S. Air Force Medical Service Digest is devoted to the Air Force Dental Service. It describes in detail the development of the military dental service from preCivil War days to the present, the personnel of the Air Force service, training programs, career opportunities and work being done in preventive dentistry. In addition, the booklet describes the activities of the dental and oral pathology services of the Armed Forces Institute of Pathology and the research of the U. S. Air Force School of Aviation Medicine.

CITE THREE DENTAL MEN FOR OUTSTANDING QUALIFICATIONS

The awarding of the prefix "A," highest professional specialty rating obtainable in the Army Medical Service, to three members of the Army Dental Corps was announced in December by the Army Medical Service Officer Classification Board.

The officers are Col. Lynn C. Dirksen, commanding officer of the Central Dental Laboratory at Walter Reed Army Medical Center, Washington, D.C.; Col. Jack Caldwell, chief of oral surgery at Letterman Army Hospital, San Francisco, and Col. H. Beecher Dierdorff, chief of the dental service, Fitzsimons Army Hospital, Denver.

This brings to five the number of Army dental officers awarded the prefix "A." The rating is given for outstanding qualifications in the chosen specialty of the officer. Certification by his respective specialty board is a requisite.

General

CANCER SOCIETY TO CONFER FIRST DENTAL FELLOWSHIP

Another step was taken on the road toward equal recognition of dentistry with other specialties of medicine when, for the first time, the American Cancer Society, Inc., this year made available to a dentist a clinical fellowship in oral pathology. The Society has supported fellowships and other training programs in medicine to the extent of some two million dollars.

The dental fellowship, which is tax-exempt, pays a stipend of $3,600 and is for one year's duration. The successful candidate will work under the direction of Paul E. Boyle, professor of oral histology and pathology at the School of Dentistry of the University of Pennsylvania in Philadelphia.

An applicant for the fellowship must be a graduate of an American or Canadian dental school. Application should be made directly to the School of Dentistry, University of Pennsylvania.

A.A.A.S. COUNCIL VOTES SUPPORT OF FLUORIDATION

The American Association for the Advancement of Science, largest body of scientists in the world, voted support of fluoridation as "an effective public health measure for the mass partial control of dental caries" in a resolution passed by its Council at the A.A.A.S. meeting December 27-30 in Berkeley, Calif. The resolution had been submitted by the Dental Section.

Noting that one of the objectives of the science group is "to increase public understanding and appreciation of the importance and promise of the methods of science in human progress," A.A.A.S. went on record supporting the health measure. Its resolution states that fluoridation is now in its eleventh year as a "widely endorsed public health program" and that it is "repeatedly demonstrating" its effectiveness as a method for advancing dental public health.

Dentistry, now an independent section of the A.A.A.S., had its own program December 28. Elected section chairman was H. Trendley Dean, secretary of the American Dental Association Council on Dental Research. With this election, Dr. Dean automatically becomes a vice-president of the A.A.A.S. Another member of the Council is George C. Paffenbarger, chief of the American Dental Association research staff at the National Bureau of Standards, who represents the American College of Dentists. The International Association for Dental Research is represented by S. Wah Leung, School of Dentistry, University of Pittsburgh.

Elected to the committee at large were Willard C. Fleming, dean of the College of Dentistry of the University of Cali-

fornia; Wendell Wylie, College of Dentistry of the University of California; Thomas J. Hill, honorary member of the American Dental Association, and James Shaw, Ph.D., Harvard School of Dental Medicine.

Secretary of the dentistry section is Russell W. Bunting, dental consultant of the Federal Civil Defense Administration. J. F. Volker, School of Dentistry of the University of Alabama, was chosen chairman of the local arrangements committee for the 1955 meeting.

The morning session of the dentistry section discussed growth and development of the facial and oral tissues. The afternoon session was devoted to a symposium on radiation hazards in the dental office.

Dentists wishing to join Section Nd (Dentistry) of the A.A.A.S. may apply by writing to Russell W. Bunting, School of Dentistry, University of Michigan, Ann Arbor, Mich.

FORECASTING AMERICA'S HEALTH IS FORUM THEME

The 1955 National Health Forum, to be held March 23 and 24 at the Hotel Sheraton Astor, New York, will concern itself with forecasting America's health, according to A. W. Dent, president of the National Health Council. The 48 Council member organizations annually sponsor the Forum. Daniel F. Lynch of Washington, D. C.; Percy T. Phillips of New York, and Charles H. Patton of Philadelphia represent the American Dental Association on the Council.

Outlining plans for the Forum, Roscoe P. Kandle, M.D., deputy commissioner of the New York City Department of Health and chairman of the Forum Committee, said, "We will try to establish better guidelines along which the many groups interested in health may work more effectively together. We will check economic trends; try to gauge how atomic developments will affect health; look at current governmental programs, and see how new health programs of labor and management should alter community plans."

Persons wishing to attend the meeting may obtain advance programs from the National Health Council, 1790 Broadway, New York 19.

AMERICAN DENTURE SOCIETY SPONSORS ESSAY CONTEST

Prizes of $500 and $300 will be awarded to the two senior dental students submitting the best essays on prosthetic dentistry in a contest designed to stimulate technical writing by dental students. The essay contest, sponsored by the American Denture Society, is open to all senior dental students in the United States and Canada. Essays must be submitted by July 15, and only two may be submitted from any one dental college.

Rules for the competition may be obtained from Arthur L. Roberts, secretary of the American Denture Society, Aurora Main Bldg., 4 Main St., Aurora, Ill.

LLOYD ROGERS COMMENDED FOR MERITORIOUS CONTRIBUTIONS

Lloyd Rogers of Detroit, member of the Association subcommittee on civil defense and president of the staff of the Detroit Receiving Hospital, has been singled out for special commendation by the city's Common Council. The governing body on December 7 praised Dr. Rogers for his dedicated service in the field of oral surgery.

In a resolution which cited Dr. Rogers for the founding 39 years ago of the first dental clinic in Detroit devoted to oral surgery, the Common Council said, "This dental clinic has established a national reputation and serves as a shining example for others." Expressing the appreciation of the people of Detroit for Dr.

Rogers' "meritorious contributions," the Council also commended him for his "significant contribution to the training of young oral surgeons in this community and to dental education."

As a member of the Association subcommittee on civil defense, Dr. Rogers has been one of the leaders in the establishment of the nationally known "Detroit plan" under which dentists are given instruction in casualty treatment by oral surgeons in hospitals throughout the city.

Dr. Rogers also has the distinction of being the first dentist ever elected president of the Detroit Receiving Hospital; rarely has a dentist been appointed to the chief post of any hospital.

INTERNSHIPS, RESIDENCIES AT BRONX HOSPITAL

The department of dentistry of the Bronx Municipal Hospital Center announces four rotating dental internships and two residencies in oral surgery. Application forms may be obtained from the director of the dental department, Bronx Municipal Hospital Center, Morris Park Ave., East Chester Rd., The Bronx 61, New York.

HOSPITALS OFFER INTERNSHIPS, RESIDENCIES

Internships and residencies are offered at two New York hospitals. The Dental and Oral Surgery Service of Mount Sinai Hospital is offering three rotating internships in dentistry and one residency in oral surgery for the year beginning July 1955, and Sea View Hospital in Staten Island offers a one year residency in prosthetics, which also begins in July.

Information on the appointments at Mount Sinai may be obtained from Jack Ruthberg, M.D., assistant director of the hospital, 5th Ave. and 100 St., New York 29. Information on the Sea View Hospital residency may be obtained from Irving E. Gruber, director of the dental department, Sea View Hospital, Staten Island 14, N. Y.

ASSOCIATION OF MILITARY SURGEONS RENAMES MAGAZINE

The journal of the Association of Military Surgeons of the United States, known as *The Military Surgeon,* has been renamed *Military Medicine* beginning with the January issue. The Association believes the new name better covers the scope of the journal.

DENTISTS WARNED AGAINST PRINTING SALESMAN

It has been reported that a man claiming to be a printing salesman has been approaching dentists, physicians and hospitals for printing orders which he fails to deliver. The man, J. F. Stewart, who gave a Washington, D.C., address, appeared in Uniontown, Pa., in August and accepted advance payments for his orders. A check with the Better Business Bureau revealed that numerous complaints had been received concerning his activities.

DENTIST, VICTIM OF POLIO, OFFERS MAGAZINE SERVICE

Louis W. Soldan, a dentist confined to a wheel chair because of severe polio paralysis, is operating a magazine subscription service through which magazines for the home or office may be ordered conveniently. Dr. Soldan's service handles new subscriptions and renewals. In addition, magazine gift subscriptions may be purchased under a special "Choose-A-Gift" plan. Further information may be obtained from Dr. Soldan, 135 Edgewater Drive, Framingham, Mass.

Honored recently for 50 years of service in the dental profession were the 18 dentists pictured above. Graduates of the School of Dentistry of the University of Buffalo in 1904, they were honored at the School's 52nd annual homecoming by the dental alumni association October 21 at the Hotel Statler. Seated left to right are: Arthur J. Foster, Howard B. King, Clarence R. Averill, Alice L. Murphy, John B. West, Frank J. Moyer, Jr., Martin V. Boyd and Garnett H. Morden. Standing (l. to r.) are: John F. Clifford, George A. Wilson, Ward H. Cowles, Clarence A. Thorn, Peter B. Van Wie, N. Lee Otis, Andrew T. Cahill, Charles M. McNealey, Howard T. Gallager and Frank H. Tatlock.

SET POLICY ON OPERATION OF OFFICE BY DENTIST'S ESTATE

The Department of Licenses of the State of Washington in November issued a policy on the operation of a dental office by the estate after the death of the dentist. According to the Washington State Dental Association, this policy allows the office to be operated in the name of the dentist by his estate for a period of not longer than 60 days. If a licensed dentist is employed by that office, treatment begun before the death of the dentist in whose name the office is operated may be completed. In no case, however, are new patients to be accepted or new treatment started within the 60 day period.

The state dental association reports that the policy is important in that it will prevent advertising offices from remaining in operation for indefinite periods after the death of the owner, as has happened previously.

SOCIETY FOR ADVANCEMENT OF ANESTHESIA TO MEET

The spring meeting of the American Society for the Advancement of General Anesthesia in Dentistry will be held March 28 at the Hotel Shelburne in New York. Methods for the prevention of shock from adrenal insufficiency during anesthesia in surgery will be discussed by Lyon P. Strean of West Orange, N. J.; anesthetic management of the difficult dental patient by Stanley R. Spiro of New York, and technic for rapid relaxation by Aaron A. Moss of Bernardsville, N. J.

NEW YORK HEALTH DEPARTMENT SEEKS DENTIST

Vacancies in the position of part-time dentist for the Health and Welfare Departments of the City of New York have been announced by the city's civil service

commission. The salary runs from $10.675 to $16.25 per session for 300 or more sessions a year. Minimum requirements for the position are graduation from a school of dentistry approved by the University of the State of New York and license to practice dentistry in the state. Further information may be obtained from the Department of Personnel, City of New York, 96 Duane St., New York 7.

T. C. Blutau

KANSAS CITY ALUMNI SELECT CLINIC SUBJECTS

Problems in denture construction will be the subject of a panel discussion at the seventy-fourth annual clinic meeting of the Alumni Association of the University of Kansas City School of Dentistry March 6-8 in Kansas City, Mo.

The panelists, presided over by Hubert Eversull of Kansas City, Mo., will be Harold Harris of Denver; Harry Klenda of Wichita, Kan.; Philip Jones of Kansas City, Mo.; Arthur L. Roberts of Aurora, Ill., and John R. Thompson of Chicago.

Essays will be presented on abnormal function of the temporomandibular joint, abnormal functional occlusion of the teeth and the civilian-military relationship in dentistry. In addition, scientific exhibits and table clinics will be held at the dental school.

T. C. BLUTAU, NEW YORK DENTAL LEADER, DIES AT 55

Theodore C. Blutau, a former president of the New York State Dental Society, died December 27 in Rochester, N. Y. He was 55 years old. Dr. Blutau served the dental profession in a number of capacities. In addition to his post with the state society, Dr. Blutau at one time headed the Rochester Dental Society and the Seventh District Dental Society of the State of New York. He served for many years as Seventh District delegate to the American Dental Association House of Delegates.

For 15 years Dr. Blutau was a member of the teaching staff of the Eastman Dental Dispensary. He resigned from the staff in 1951. He was a Fellow of the American College of Dentists and a former president of the Rochester Dental Study Club.

KELLOGG FOUNDATION GRANTS $116,833 TO DENTISTRY

The W. K. Kellogg Foundation made grants of $116,833 for programs in dentistry during the 1953-54 fiscal year. The Foundation's annual report shows support of such projects as regional conferences on dental education, fellowships and a dental hygienist training program. Included in the year's appropriations but not expended was $250,000 to the American Dental Association for a survey of the dental profession. The survey is still in the planning stage.

URGE CONTRIBUTIONS FOR 1955 MARCH OF DIMES

A total of $64,000,000 must be raised in 1955 to carry on the fight against polio, the only contagious, uncontrolled disease on the increase in the United States, the National Foundation for Infantile Paralysis has announced. In an appeal for funds, the Foundation stated that its

1955 March of Dimes program would raise money to continue work in scientific research, patient care, the vaccine program and professional education.

With 1954 the nation's third worst polio year, money is needed to care for persons already stricken with the disease, the Foundation reports. In addition, finances are needed for the evaluation of the results of the Salk vaccine tests, and additional health personnel must be trained under the March of Dimes scholarship program.

Contributions may be sent to local offices of the 1955 March of Dimes or to the 1955 March of Dimes, 120 Broadway, New York 5.

HYGIENISTS ORGANIZE CEREBRAL PALSY STUDY GROUP

A cerebral palsy study group designed to study the dental problems of and to provide dental service for persons with cerebral palsy has been formed by the Dental Hygienists Association of the City of New York. The study group is cosponsored by the Dental Guidance Council for Cerebral Palsy.

The Dental Guidance Council has appointed as dental adviser to the study group Robert L. Fisher, a past president. Dr. Fisher will work with Miss Beatrice Goldner, a past president of the hygienists' group, in setting up the lectures, seminars and field trips.

Also • Thomas F. Powers of Plainfield, N. J., has been appointed to the American Dental Association Council on Federal Dental Services by president Daniel F. Lynch. . . . A dentist is president pro tem of the North Carolina senate. He is Paul E. Jones, chairman of the Association's Council on Legislation. . . . Edward Taylor, Texas state dental director, who had been on indefinite sick leave, will be back at work shortly. . . . La Semaine Odontologique 1955, scientific meeting of the French dental associations, will be held in Paris March 31 to April 6. Information on the event may be obtained from Maurice Vincent, general secretary, 31, rue Tronchet, Paris 8e. . . . P. O. Pedersen of Copenhagen has been appointed dean of the Danmarks Tandlaegenhojskole (The Royal Dental College). His appointment will be effective March 1. . . . The midwinter dinner of the dental alumni society of the University of Pennsylvania will be held February 22 in Philadelphia. . . . Lawrence J. Linck, a leader in the health and welfare field, has resigned as executive director of the National Society for Crippled Children and Adults. Under Mr. Linck's direction the Society has expanded from 17 state societies in 1945 to 52 such units. . . . February 9 is the date of the monthly conference of the New York Institute of Clinical Oral Pathology. The meeting will be held at the New York Academy of Medicine. . . . The Western Society of Periodontology and the California Academy of Periodontology will hold a combined meeting in Las Vegas, Nev., February 11-13.

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

HIGHER HANDPIECE SPEEDS

A good deal of interest is presently centered on operating with higher handpiece speeds. Greater speeds depend not only on less friction in the handpiece but on more friction between engine and handpiece. Slippage and lack of traction can account for a loss of efficiency and failure to attain the maximum rpm for any particular acceleration apparatus.

Accordingly, I wish to comment that merely using a new handpiece cord in the place of one used but two weeks under normal conditions raised my handpiece speed from 17,500 rpm to 22,500 rpm. This point is made not to advocate higher speeds but rather to suggest that where high speeds are desired, cleaned cords free from even the slightest accumulation can be of great assistance.

Jerome S. Mittelman

EXPLAINS FAILURE OF PULPOTOMY

The reason for Charles P. Shoemaker's failure in the majority of his pulpotomies ("Results of 28 Pulpotomies," J.A.D.A. 50:71 Jan. 1955) is not far to seek. Apparently Dr. Shoemaker is not aware that zinc oxyphosphate cement is a poor sealing agent and permits the ingress of saliva along the margins of the cavity to the region of pulpal amputation, thus nullifying the benefits of his sterile technic. Grossman (J. D. Res. 18:67 Feb. 1939) showed that zinc phosphate cement allowed marginal leakage within 24 hours after setting and should therefore not be used to seal the cavity against saliva during endodontic procedures. He advocates the use of zinc oxide and eugenol paste to seal the cavity under the zinc phosphate cement. We have repeated and confirmed his findings (Massler and Ostrovsky, J. Den. Children First Quarter, 1955).

Successful pulpotomy depends on good marginal sealing and prevention of salivary contamination. Zinc oxide and eugenol cements and amalgam are very effective in this respect. Zinc oxyphosphate cement is not. If Dr. Shoemaker will place a layer of fast-setting zinc oxide and eugenol cement over his calcium hydroxide and asbestos, I feel sure that he will be more successful. We have been successful in over 80 per cent of the more than 400 pulpotomies performed in deciduous and permanent teeth.

Maury Massler

FLUORIDATION IS SAFE

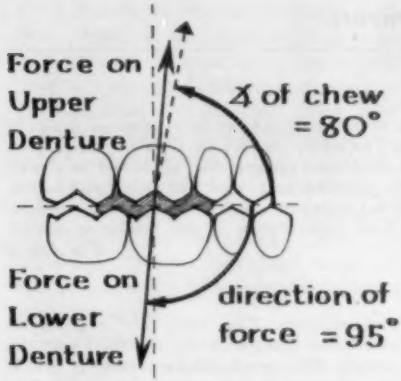
Paul Manning's letter in the October issue of THE JOURNAL condemns fluoridation of water. In reply I would like to state that for generations people have "soaked their bodies in it" without ill effect. They and their infant children have even drunk it. Our president, vice-president and other high officials drink it daily on the advice of the highest authority in the land. Yes, men and groups recognized as the most capable in all the world, who are slow indeed in giving their stamp of approval, have endorsed fluoridation as safe and effective.

It is my opinion, and I am sure the opinion of many thousands, that Dr. Manning is doing harm to American children by attempting to slow the adoption of fluoridation.

S. Solomon

MASTICATION AND DENTURE STABILITY

I would like to thank William Eberle for the interest he has taken in my paper "The Relation of Occlusal Surfaces to the Stability of Artificial Dentures," J.A.D.A., May 1954, and for his interesting and intelligent comments which appeared as a letter to the editor in THE JOURNAL August 1954. However, there



Calculated force direction in sagittal plane on lower denture and equal and opposite force on upper denture when dentures have teeth with a cuspal slope of 30 degrees, patient an antero-posterior angle of chew of 80 degrees, and food chewed is tough meat

are two points on which I cannot concur with Dr. Eberle.

First, I would like to point out that both Kurth and Boswell did study the three dimensional motion of mastication and did not limit their studies to two dimensions as Dr. Eberle stated. Both these authors demonstrate chewing tracings (and consequently the angle of chew) in the sagittal (anterior-posterior) plane, as well as in the frontal plane. (See Kurth, J.A.D.A., July 1949, and Boswell, J. Pros. Den. May 1951.)

Secondly, I would call attention to Appendix III of my paper entitled "Dependence of Denture Stability on Anteroposterior Angle of Chew," where the anterior-posterior component of the masticatory force was considered in relation to complete denture stability. It was shown that this third dimensional component does not significantly affect denture stability.

A more detailed analysis of the sagittal angle of chew and masticatory force component is given in two of my forthcoming papers: "A New Method of Determining the Functional Forces Applied to Prosthetic Appliances and Their Supporting Tissues" (soon to appear in J. Pros. Den.); and "The Functional Force Control Method for Complete Denture Prosthesis," which is concerned with a practical complete denture technic.

In these two papers it is shown that:

(1) One can accurately describe the direction of the three dimensional masticatory force by determining, in addition to the lateral force vector, the direction of the sagittal force vector—making use of the anterior-posterior angle of chew and the same charts and method presented in the "Occlusal Surface" paper.

(2) The magnitude of the sagittal component (or "thrust") is small as compared to the frontal (lateral) component during mastication.

(3) The sagittal component of the masticatory force is directed distally (posteriorly) on the lower denture and mesially (anteriorly) on the upper denture, for the "reasonably average patient" with flat or anatomic occlusal surfaced posterior teeth. This sagittal component, in general, therefore, aids lower denture stability and also may tend to seat the upper denture (illustration).

(4) If it is desired, one can completely eliminate the sagittal component of the force by properly shaping the cuspal inclines of the teeth. This shaping would result in a vertical force direction in the sagittal plane.

The action of a nutcracker cited by Dr. Eberle is therefore not an appropriate analogy to the motion of the jaw. The nutcracker operates on a large, hard, brittle nut, and the maximum force is exerted when the arms are wide open. In the mouth two artificial dentures operate on nonbrittle, compressible food; the maximum force of mastication occurs during the last closing motion when the intermaxillary space is small and the upper and lower occlusal planes are essentially parallel. The physical force situations are thus entirely different in the two cases, and the resulting forces differ considerably.

Harvey Stallard's paper, referred to by Dr. Eberle, is not meant to be quantitative, and considers only the sagittal (forward) component of the force for natural teeth. The paper is unrelated to the points in question and contains no evidence for Dr. Eberle's statement that "by far the most powerful thrust of the mandible is the forward component." I feel that this statement is incorrect and not supported by any scientific evidence whatsoever.

Robert S. Ledley

Book Reviews

BEYOND THE GERM THEORY: THE ROLES OF DEPRIVATION AND STRESS IN HEALTH AND DISEASE

Edited by Iago Galdston, M.D. 182 pages with illustrations. Index. Price $4. New York, Health Education Council, 1954.

This book is divided into four parts: "The Dynamics of Deprivation and Stress," "Nutritional Deprivation and Stress," "Psychological Deprivation and Stress" and "Social Stress and Deprivation." There are 11 chapters contributed by outstanding writers, clinicians and teachers.

The book does not deny the germ theory of disease but emphasis is placed on the disease-producing aspects of deprivation and stress. Nutrition is defined as a bodily process; diet as a regimen of food which supports nutrition. Tissue changes characteristic of deficiency are readily observable in the tongue, gums and sclera.

It is noted that the nutritional requirements of the aged are not very different from those of other adults. The dental difficulties of older people may lead them to avoid certain foods and to limit their intake to soft items. Such a diet results in the elimination of food containing essential nutrients.

The book concludes, "As long as there is anxiety and aggression [in society] we know that the time is out of joint. . . . But when people can no longer react with anxiety and rage . . . a state of apathy has been reached [which is] more to be dreaded than the atom bomb."

R. M. Walls

HISTOLOGIA DENTARIA HUMANA

By Jorge Erausquin. 281 pages with 175 illustrations. Buenos Aires, Progrental, 1953.

This is an excellent book on dental histology. The material is arranged in the conventional manner; the tissues from enamel to gingiva are described. The author has restricted the scope of the book to descriptive and interpretative histology, excluding embryology and histogenesis. The single tissues are discussed with clarity, completeness and with full consideration of the literature and of controversial theories. All illustrations are drawings from microscopic sections. There are many diagrams.

The fact that the author chose drawings rather than microphotograms seems at first surprising. Figures in a textbook, however, serve as visual education where omission of unimportant details, combination of parts from different microscope sections and diagramming may be of considerable help. The figures are of value only if the drawings are made from original sections by a reliable artist and are checked by the author. The figures in Erausquin's book fulfill these requirements.

It is inevitable that there will be points of disagreement in some details between author and reviewer. Some may be mentioned; for instance, his belief that there are nerves in the dentin, the statement that the odontoblasts are not cells of the dentin because their body is contained in the pulp, the weak statements on the intermediate plexus of the periodontal fibers.

It is regrettable that this text, written in Spanish, will not have the wide circulation that it deserves. But a study of the illustrations and the excellent bibliography will be extremely helpful to teachers of dental histology and advanced students alike.

Harry Sicher

HYPNOTISM, AN OBJECTIVE STUDY IN SUGGESTIBILITY

By André M. Weitzenhoffer, Sc.M., A.M. 380 pages with 7 illustrations. Index. Appendix. Price $6. New York, John Wiley and Sons, Inc., 1953.

In this book André Weitzenhoffer has made several significant contributions to one segment of psychology. These contributions, however, will have limited value to the practicing dentist unless he has an academic interest in hypnosis. The author himself emphasizes that "this book is not directly concerned with the applications of hypnosis to therapy. Nor is it intended to teach how to hypnotize." He further states that "hypnotizing is an art for which thorough understanding of human psychology and considerable practice are essential. . . . Hypnotic phenomena are very complex indeed. . . . The undesirability of the use of hypnosis by poorly trained individuals cannot be overemphasized."

The author's primary aim was to provide a useful source of information. There is a comprehensive bibliography of over 500 items and adequate author and subject indexes. A major part of the book is devoted to a survey and analysis of the literature in the field of hypnosis. The book, therefore, will save many hours of library research. The need for further research is emphasized throughout the volume.

Studies of hypnotic anesthesia and analgesia are reviewed in three pages. The specific benefit to the dental profession from reading the book probably will be an increased awareness of the fact that the phenomenon of pain perception is complex and that our knowledge in this field is still limited.

C. M. Peebles

UNIVERSITY EDUCATION FOR ADMINISTRATION IN HOSPITALS: A REPORT OF THE COMMISSION ON UNIVERSITY EDUCATION IN HOSPITAL ADMINISTRATION, 1954

199 pages. Index. Price $3. Washington, D. C., American Council on Education, 1954.

This report is the result of an 18 month study of the 12 university, degree-granting programs of graduate education in hospital administration, all but one of which have been developed since 1943. The study was initiated by the Association of University Programs in Hospital Administration and conducted by an independent commission directed by Herluf A. Olsen of the Amos Tuck School of Business Administration, Dartmouth College.

The report begins with an excellent exposition of the special characteristics of hospital administration and the qualities required of administrators. In its recommendations for the future of existing programs it is disappointing.

The Commission, in its zeal to design an ideal program, has drawn heavily on the experience in programs of university education in business administration, industrial management, law and engineering. Thus there is deemphasized, if not ignored, the important concept that the hospital's first concern is the patient. For instance, although one of the four areas of the proposed academic course is described as "environment of administration in hospitals," it is difficult to believe that such separate consideration of environmental subjects would be an improvement rather than be a retrogression.

Leaders of at least one program well known to this reviewer infuse environmental knowledge throughout all areas of the curriculum, believing that to consider environmental knowledge separately is to give it less importance than it requires. If administration is not thoroughly steeped in the concept that the hospital's prime objective is to provide the best possible care for the patient, and that all policy making must be done with this in mind, wrong attitudes inevitably are reflected in all other departments, to the patient's detriment.

The proposed new pattern is designed for students between 21 and 27, the admission age limits proposed by the Commission. Here the fact is apparently ignored that the university must be sensitive to and must reflect the needs of the society it serves. Students are on the whole much older than the suggested upper age limit when they enroll; from the start of the first program in 1954 more than half have been 30 or older.

The age differential, too, has caused the Commission some concern. It claims that the heterogeneity in classes in which the youngest student may be 27 and the oldest 44 causes difficulty in program planning, teaching and learning. Greater importance is attached to homogeneity than to the fact that the stimulus derived by students and faculties from association with others from different disciplines is part of the value of graduate education. Students in present programs come from business, industry, medicine, teaching, nursing or related fields, all of which are represented in the day-by-day work of the hospital. The desired homogeneity derives from the common objective just as it does in the hospital.

Again the Commission stresses the importance of steadfastness of motivation but deplores the present emphasis on experience and maturity as a condition for admission. It is hardly credible, however, that motivation can be considered truly steadfast in a person so inexperienced that his outlook has been shaped almost entirely by environmental and educational influences. Surely the most dependable motivation exists in the student willing to make the necessary sacrifices to return to the university after a period of successful experience in order to broaden his field of endeavor or to prepare for one in which the rewards usually are more personally satisfying than lucrative.

If the proposed policies had been in effect when today's graduates were admitted, our hospitals would have been denied some of their most effective leadership. The program outlined would probably produce a supply of competent hospital business managers, but it is doubtful whether it would produce good hospital administrators.

Paddy Rudd Howes

HISTOCHEMISTRY, THEORETICAL AND APPLIED

By A. G. Pearse, M.A., M.D. 530 pages with 4 color plates and 109 illustrations. Appendixes. Index. Price $12.00. Boston, Little, Brown and Company, 1953.

This volume is a handbook of histochemical technic. It covers the chemical theory and the various methods for visualizing such substances as proteins, carbohydrates, lipides, enzymes, pigments and inorganic substances in tissue sections. The text is accompanied by a generous number of excellent illustrations. Each chapter has a large number of references. Complete directions for many of the procedures are given in a series of appendixes. Included also is a brief and superficial discussion on physical methods. The book is the most complete English reference in the field and is a useful laboratory aid.

In the discussion of fixation, appropriate gestures are made to the superiority of the freeze-drying method, but many of the author's subsequent observations and illustrated results are based on chemical fixation and especially on fixation achieved by the use of cold Formalin. It has been my own experience that often such chemical fixation gives spurious results. Judging from the text this is well known to the author also.

Pearse states that his aim is "to compass the whole of histochemistry as applied to tissue sections." Histochemistry has to do with such broad areas as the study of the structure and function of cells, tissues and organisms at the microscopic and submicroscopic levels. It is unfortunate that today "know-how" and technics are virtually worshipped. Yet, at best, these can be only subservient to ideas, to abstractions. Indeed, histochemistry would be circumscribed were it confined to the localization of colored precipitates in tissue sections.

M. Engel

WOODIE AND THE JOLLY DENTIST BATTLE THE WICKED LACTOPHILIA

By W. S. Monica, D.D.S. 20 pages with 23 illustrations. Price $1.50. New York, Pageant Press, 1953.

Woodie and the Jolly Dentist should make an impression on a grade school reader that will last the rest of his life. The story tells of a youngster's experience that begins with a toothache in the night and reaches a happy ending in a painless and instructive session in the dentist's office the next day.

Woodie learns from the dentist that his toothache was caused by tooth decay, and that tooth decay is caused by Lactophilia and her large family who build houses, playgrounds and swimming pools in the mouth, swimming pools with sugar water in them. "Ole Lacky" and her family swim in the pool, drink the sugar water and leave acid—and acid dissolves iron—and iron is what holds up the Brooklyn Bridge and the Empire State Building.

Lacky, as illustrated by Martin Barr, is a revolting creature whose appearance might be frowned on by modern psychologists even though her ugly face undoubtedly will have a beneficial effect; the young reader probably will be frightened into keeping his teeth forever.

Marian F. Driscoll

BOOKS RECEIVED BUT NOT REVIEWED

SHOULD YOU DRINK • By Charles H. Durfee, Ph.D. 152 pages. $2.49. The Macmillan Co., 60 Fifth Ave., New York, 1954.

HUGH ROY CULLEN: A STORY OF AMERICAN OPPORTUNITY • By Ed Kilman and Theon Wright. 376 pages with illustrations. $4. Prentice-Hall, Inc., 70 Fifth Ave., New York, 1954.

ART OF ASIA • By Helen Rubissow. 237 pages with illustrations. $6. Philosophical Library, Inc., 15 E. 40th St., New York, 1954.

THE SCOURGE OF THE SWASTIKA: A SHORT HISTORY OF NAZI WAR CRIMES • By Lord Russell of Liverpool. C.B.E., M.C. 259 pages with illustrations. $4.50. Philosophical Library, Inc., 15 E. 40th St., New York, 1954.

THE MANUAL OF ANTIBIOTICS, 1954-1955: PREPARATIONS, THERAPEUTIC INDEX, GENERIC AND TRADE NAMES, PRODUCERS • Prepared under the editorial direction of Henry Welch, Ph.D. 87 pages. $2.50. Medical Encyclopedia, Inc., 30 E. 60th St., New York, 1954.

THREE "INCARNATIONS"—PART OF THE STORY OF A WOMAN'S LIFE • By Florence Sylvester Winchell, M.D. 268 pages with illustrations. $3.50. Christopher Publishing House, 1140 Columbus Ave., Boston, 1954.

THE BANE OF DRUG ADDICTION • By Orin Ross Yost, M.D. 155 pages. $4. The Macmillan Co., 60 Fifth Ave., New York, 1954.

Current Literature

FREEZE-DRIED BANK BONE AND ITS APPLICATION IN CLINICAL ORAL SURGERY

C. H. Blackstone. Mil. Surgeon 114:437 June 1954.

The bank bone is prepared at the National Naval Medical Center by freezing the bone and drying it under high vacuum. The resultant bone is porous with a friable spongelike structure and can be stored at room temperature in vacuum bottles. This bone can be used (1) to restore continuity where mandibular bone has been lost, (2) to restore contour and fill defects produced by surgery, and (3) to fill defects created by the removal of unerupted third molars.

In 20 cases where freeze-dried bank bone was used, only two failures occurred, and these were ascribed to faulty surgical procedures rather than to the material used.

The advantages of this procedure over fresh autografts are a decrease in operating time, less postoperative discomfort and less nursing care. The postoperative course in all the cases has been uneventful. This is a preliminary report; further studies of the physiology and histology of such bone repair are under way.

Charles W. Freeman

LARYNGOSPASM IN ORAL SURGERY

Adrian O. Hubbell. J. Oral Surg. 12:286 Oct. 1954.

Laryngospasm is an infrequent complication when anesthesia and surgery are skillfully managed. When laryngospasms do occur, they need not be dangerous or alarming if properly treated. The operator and a minimum of two trained assistants should function as a team to manage this complication effectively.

Prevention depends on avoiding irritation of the larynx. Skillful packing of the mouth and aspiration are essential. Atropine decreases secretions and is recommended for longer operations. Frequency of spasms varies with the method of administration of thiopental sodium (Pentothal). Obliteration of the protective laryngeal reflex should be avoided.

When laryngospasm occurs, the pharynx is examined immediately for foreign material with a headlight and an aspirator. The mandible is held forward in a protrusive position and the tongue firmly extended. Oxygen is supplied to the glottis through the nares and pharynx with a nasal mask. Most spasms are partial so that this treatment is all that is necessary. For more complete spasms the use of succinylcholine chloride is recommended. Each member of the surgery-anesthesia team has definite duties to perform.

Premedication with central nervous system depressant drugs should be used only when there is a specific indication. Endotracheal intubation is not a desirable treatment for laryngospasms. The application of oxygen with force with a full face mask is not proper treatment of spasms, especially for oral surgery patients.

Spasms can be corrected with certainty in approximately one minute. For the detailed technic required to manage a spasm, coordinated teamwork of the surgeon-anesthetist and two assistants is of prime importance.

DISTANT METASTASIS FROM CARCINOMA OF THE ORAL CAVITY

S. Gordon Castigliano and C. Jules Rominger. Am. J. Roentgenol. 71:997 June 1954.

The problem and significance of distant metastasis from malignant lesions primary in the oral cavity were studied through an analysis of 752 cases of oral malignancy. Cases of distant metastasis should be reported on the basis of total experience rather than on autopsy experience. By so doing a clear conception of the small part that distant metastasis plays in the problem of oral malignancy can be obtained.

The accuracy of clinical diagnosis of visceral metastasis may be as high as 80 per cent when diagnostic aids, including roentgenograms of the lungs and bones and laboratory studies, are properly used.

The cases studied were divided into two groups according to the periods in which the patients died; the first period covered 1930 to 1943, the second 1943 to 1951. This division was made largely because of radical changes in cancer therapy that occurred around 1943. With the development of improved irradiation procedures, the salvage rate and the amount of long term palliation have been increased. These changes are significant as patients surviving a longer period of time have a greater opportunity to develop visceral metastasis.

In the group analyzed, of 200 patients known to have died of cancer of the oral cavity from 1930 to 1943, only 2 per cent presented evidence of distant metastasis, whereas of 121 patients known to have died from cancer in the period from 1943 to 1951, 10.7 per cent presented evidence of distant metastasis.

Visceral metastasis involved the lungs, bones, liver, brain, skin, muscles, heart, kidneys and small intestine. In spite of the increase in the incidence of visceral metastasis associated with oral malignancy, distant metastasis is still not as serious a problem in oral cancer as in other forms of cancer such as those of the breast, stomach and rectum, the incidence being much lower and the onset much later. Survey roentgenograms of the lungs and bones prior to radical surgery for advanced primary and secondary disease are advisable. The cure of oral malignancy requires control of the local disease and its regional metastatic spread.

E. C. Hinds

DENTAL CARIES IN THE COTTON RAT XV. THE EFFECT OF TOOTH MATURITY AND MINERALS ON CARIES PRODUCTION BY SEMI-SYNTHETIC DIETS

Marguerite A. Constant, H. William Siefert, Paul H. Phillips and C. A. Elvehjem. J. Nutrition 53:29 May 10, 1954.

The purpose of the study was to determine the effects of dietary calcium, tooth maturity, acidic and basic salts on caries and to attempt to modify the cariogenicity of low calcium diets. Young cotton rats were allotted to control and experimental groups by littermates and were fed the basic diet plus experimental mineral mixtures. Lesions were evaluated by Shaw's method.

Dietary calcium ($CaCO_3$) was added and all other minerals kept constant. A decrease in the level of calcium from 0.56 to 0 per cent caused an increase of caries incidence from 5 (0.56 per cent Ca) to 15 (0 per cent Ca) and extent from 6+ to 21+. The rats were fed low calcium diets at 2, 5 or 8 weeks of age. A delay in feeding until the age of 8 weeks decreased caries susceptibility. Feeding intermediate levels of calcium gave little protection against a high sucrose diet.

Acidic inorganic, basic or acidic organic or neutral salt mixtures gave no protection against decay. However, basic inorganic salt mixtures resulted in considerable decrease in tooth decay. The level of minerals used was twice as high as that usually used in nutrition experiments, and the unequal total weights of the salt mixtures resulted in slightly variable amounts of essential elements. This was equalized later by adding celluflour. The data indicate that the increased pH of the diet is a factor in the protective effect of the minerals.

Attempts were made to modify the cariogenicity of low calcium, high sucrose diets. Increasing the fat content to 15 per cent did not protect against decay. The type of protein tended to modify the cariogenicity, but the possible influence of the minerals associated with the proteins was not ascertained. The substitution of 66 per cent of the sucrose by mixed carbohydrate did not decrease the caries production caused by a low mineral (calcium) diet.

Dorothea F. Radusch

THE TREATMENT OF A TYPICAL DISTOCCLUSION CASE EMPLOYING THE OPEN-TUBE APPLIANCE

James David McCoy. Am. J. Orthodont. 40:163 March 1954.

In the treatment of patients, the selection and application of appliance therapy are of major importance. The most simple means which can be employed without sacrificing the all-important factor of force control should be used. The diagnosis must show the necessity of (1) restoring normal arch form, (2) establishing normal anteroposterior relations, (3) overcoming vertical malrelationships, the correction of which is necessary to establish satisfactory dental function, and (4) inducing growth changes, especially in the mandible.

In the use of appliances each dental arch must be considered as composed of segments: a frontal segment containing the incisors, two lateral segments made up of the cuspids and bicuspids, and two posterior sections including the molars. Through the control of these segments at the proper "dental age," a human dentition and its supporting structures can be forced to assume normal relations and to continue progress to maturity.

The following are necessary for successful treatment: (1) an accurate differential diagnosis which reveals all parts of the facial ensemble contributing to the anomaly, (2) the establishment of normal metabolic balance so that the patient may be a satisfactory orthodontic risk, (3) the elimination of any causative factors still in effect, (4) due consideration of hereditary factors in prognosis, (5) the complete utilization of beneficial environmental forces, including a favorable age period, (6) the sustained cooperative effort of the patient and (7) therapy with an appliance which is as simple as possible and yet meets the all-

important requisite of control so that normal function, the most essential of all environmental forces for growth, may be put into effect immediately.

William F. Ford

THE EFFECT OF FLUORINE-FREE FOOD ON DENTAL AND PERIODONTAL STRUCTURES AS REVEALED BY ROENTGEN STUDIES

J. F. McClendon and J. Gershon-Cohen. Am. J. Roentgenol. 71:1017 June 1954.

Albino rats were fed on a fluorine-free diet in order to study roentgenographically the effects of this diet on the teeth and periodontal structures. The control animals were fed either a fluorine-free diet with 10 ppm fluoride added to the drinking water or were on an identical regimen except that the diets were derived from plants grown in soil instead of in fluorine-free water.

In 16 rats, the fluorine-free diets produced dental caries in 84 per cent of the molar teeth. When 10 ppm of fluoride was added to the drinking water this percentage was reduced to 6. In rats fed with soil-grown foodstuffs which had a natural fluorine content, only 23 per cent of the molar teeth had caries.

Poor periodontal condition was present in the molar region in all animals fed the fluorine-free diet. This condition contrasted with the healthy teeth and calcification in the jaws of the rats that were fed 10 ppm fluoride in the drinking water. The animals fed on soil-culture food also presented a minimum number of carious lesions.

Martin Cattoni

EVERYDAY PROCEDURE IN DENTISTRY. CAVITY PREPARATION FOR AMALGAM FILLINGS

H. M. Pickard. Brit. D. J. 96:59 Feb. 2, 1954.

Cavity preparation varies according to the amount of caries and the location of the cavity. Pain can be eliminated by the use of a local anesthetic, water and air spray as well as by the use of analgesia, general anesthesia and even hypnosis. If anesthesia is used, a more thorough cavity preparation can be made in less time; however, there is danger of excess trauma to sound dentin and to the pulp.

Many operators use rotary instruments extensively in cavity preparation. Hand instruments, though they do not cut as rapidly, serve an important function both in the early stages of the preparation of a large cavity and in the later stages of cavity completion. Straight, smooth walls and sharp angles are gained through the use of these instruments. To be used efficiently, they must be well designed and sharp.

The student learns the stages of cavity preparation one by one; but the experienced operator conforms to them almost automatically, only analyzing them when some unusual feature demands attention.

The form of the final restoration should be visualized from the outset. The restoration should be rounded smoothly, and there should be no sharp angles which would cause fracture of the amalgam.

The occlusal outline should lie not more than a third of the way up the slope of the cusp so that the stress will be borne by the peak of the cusp. The buccal and lingual walls should be carried to a self-cleansing area. The floors of the cavity should be flat and at right angles to resist the force of occlusion.

Undercuts and dovetails are used to resist displacement. A cavity having an internal diameter greater than the diameter of the entrance will be a retentive cavity. If opposing walls are made, parallel retention can be obtained. There should be only enough undercutting, and at the degree necessary, to insure that the walls are not divergent. The margin bearing heavy occlusal stress should not be undermined. Simple cavities require minimal undercutting.

The occlusal dovetail is the method of choice for retention of proximal fillings. The occlusal lock may be dispensed with in cavities whose lateral extent is not too great. Retention is obtained by a slight undercut of the buccal and lingual walls.

Under suitable circumstances, carious dentin may be left without detriment to the pulp vitality, for example, in teeth in which the pulp is not infected. It is impossible to remove all infected dentin because the bacterial penetration of the tubules is widespread. Caries left under a restorative cannot progress if the restoration has been made permanently watertight.

Sterility is accomplished by rendering the cavity margins mechanically sound. The cavosurface angle must be no less than a right angle; otherwise, it will be weak and will fracture.

Before it is filled, the cavity should be washed out with warm water, then dried until the cut surface blanches; alcohol should not be used for desiccation. Antiseptics serve no useful purpose if the filling hermetically seals the cavity.

Charles F. Bouschor

THE ORGANTIC CONTENT OF "CHALKY" ENAMEL

Maurice V. Stack. Brit. D.J. 96:73 Feb. 16, 1954.

Previous investigators have stated that "there must be an increase in the organic content of 'altered' enamel to account for the great change in the staining reaction and the increased resistance to the action of mineral acids to which it was subjected experimentally."

"Chalky enamel" is a term used to refer to the soft, white, opaque regions characteristic of recent rapid carious attacks.

The purpose of this study was to determine if there is a change in the amount of organic content when sound enamel becomes chalky.

Immediately after extraction, teeth containing opaque white spots were selected and processed. Surface debris was removed; and if no loss of surface contour was apparent, the friable material was separated by use of a blunt rose-head bur. An additional source of material was the inner surface of the enamel overhanging major cavities.

In a series of ten assorted teeth, chalky enamel was found to contain three to four times as much organic matter as the adjacent sound enamel. "Inner chalky enamel" was found to contain more organic material than "outer chalky enamel."

There was no detectable variation in the organic content of sound enamel at various points on the enamel surface.

Donovan W. Brown

PULP DISEASE AND ITS PREVENTION

W. Stewart Ross. Brit. D. J. 96:108 March 2, 1954.

A metal band with zinc oxide and eugenol is employed as a protective covering for fractured teeth when there is no exposure of the pulp. If the pulp is exposed, a covering of calcium hydroxide over the pulp is advocated or a pulpotomy with calcium hydroxide used over the region from which the pulp was excised. Success depends on (1) immediate treatment, (2) avoidance of drugs which are likely to cause injury to the pulp, (3) a wide apical foramen and (4) a caries-free tooth. Extirpation of the pulp is the treatment of choice for adults whenever there is exposure of pulp from fracture.

Infection of the pulp after trauma or dislocation of the teeth may result in bacteria being carried through the lymphatic vessels of the periodontal membrane to grow and multiply in the dead tissue of the pulp. The original site of the bacteria is the gingival sulcus. Anastomosis of lymphatic vessels may occur in the periodontal membrane and the pulp.

Infection is present at the site of exposure when the pulp is exposed by caries or fracture. Bacteremias have been produced by the passage of a smooth broach through this infected site of exposure into the apical portions of the pulp. Blood cultures that have been taken after the use of a broach in this manner supply evidence of this effect. Cautery of the infected region of the pulp before broaching would minimize the danger of spreading infection into the apical portion of the pulp.

The following measures are recommended for prevention of pulp disease: (1) pulp capping or pulpotomy, (2) reduction of caries, (3) control of heat during operating and an adequate cavity lining, (4) protection of gingival margins and the enamel.

R. J. Shankle

THE STRUCTURE AND FUNCTION OF THE MANDIBULAR JOINT

Leonard A. Rees. Brit. D.J. 96:125 March 16, 1954.

Examination of 19 fresh human mandibular joints was made by various anatomical and roentgenological technics to determine the type and degree of movement in the two compartments of the joint.

The meniscus consists of four transverse ellipsoidal segments: an anterior band, an intermediate zone, a posterior band and a bilaminar region, consisting of a stretchable temporal attachment and a nonstretchable condylar attachment. In front of the anterior band the upper joint cavity extends for a small distance. Behind this anterior extension the meniscus forms a visorlike cap to the condyle.

During function there is an eccentric hinge movement combined with some gliding in the lower compartment. In the upper compartment the meniscus slides forward on the articular eminence to the extent permitted by the degree of stretching of the bilaminar region and its temporal attachment. The potential spaces behind the meniscus and condyle appear to be occupied by soft tissues drawn in from the posterolateral aspect of the joint.

Opening and closing of the mouth occurs in six phases: (1) occlusal position, (2) retruded opening, (3) protrusive opening, (4) extreme protrusive opening, (5) closing and (6) retrusive closing. In the extreme protrusive opening phase when the meniscus has been drawn forward to its fullest extent, a "clicking" sound may occur as the condylar ridge

slips forward over the anterior band of the meniscus.

The meniscus is not homogeneous in structure. Different parts of the meniscus are interposed between the condyle and the temporal bone in different positions of the mandible. The attachments and the structure of the meniscus allow it a considerable range of movement relative to the temporal bone during mandibular function.

James Springer

THE USE OF SELF-CURING ACRYLIC IN THE MAKING OF A MOUTHPIECE

Marvin Sniderman and Lucy Irene Hollis. Am. J. Occup. Therapy. 8:115 June-July 1954.

It is frequently necessary for the severely involved paralytic patient to utilize head movements in accomplishing many of the activities that are related to his daily needs. By holding a stick in his mouth he is able to write, to dial a telephone and to do many things that otherwise he would no longer be able to do with his hands.

A satisfactory mouthpiece to hold the stick should allow the condyles to rest in a nearly normal position, should place little strain on the muscles of mastication and should eliminate lateral motion of the stick by having a wide area of contact with the teeth.

A mouthpiece of self-curing resin which fulfills these requirements has been developed and is in use at the Georgia Warm Springs Foundation. The mouthpiece is made as follows. A piece of 1/32 inch polymerized methyl methacrylate (Lucite) approximately two inches square is heated until soft. The patient bites into the plastic with a normal bite to secure a shallow indentation of the teeth. A roll of acrylic resin is placed along the bite marks on the Lucite. The patient bites into the acrylic roll and the impression is then allowed to set. This procedure is repeated with a second roll for an impression of the lower teeth.

The acrylic and Lucite impression is trimmed and attached to the cross bar of a metal "T" connection. When the impression has cured, it receives a final trim and polish. A wooden dowel with an eraser, a pencil or paintbrush may be attached with a metal clip to the stem of the "T", and the mouthpiece is ready for use. Use of self-curing acrylic resin is advantageous in that construction of the mouthpiece may be easily modified to fit the individual needs of the patient.

D. Zabin

NEW DENTIN-DESENSITIZING TECHNIC BY "ELECTRO-ANESTHESIA"

Kensaku Suzuki. J. Japan Stomatol. Soc. 19:1 June 30, 1952.

The passage of an electric current through a nerve causes an altered physiological condition of the nerve, a condition accompanied by a change in irritability and conductivity. Pflinger in 1859 showed that there was an increase in irritability and conductivity in the neighborhood of the negative pole (cathode) and a decrease in the area surrounding the positive pole (anode). Application of this principle was tried in anesthesia during minor operations at the end of the nineteenth century. The anode was fixed near the operating field while the cathode was in contact with the patient at a place distant from the site of the surgery. The method did not prove successful as it was impossible to produce sufficient reduction of irritability and conductivity of the nerves supplying the operating field.

It might be possible to operate without pain directly beneath the anode, but a short distance from the anode it was not. However, in the present study by using the scaler, the dental handpiece or other metallic instrument as the anode, it was possible to avoid earlier failures to a considerable extent. The cathode was held in the patient's hand. A weak direct current of from 4 to 20 microamperes was employed. A maximum anesthetic effect occurred at 4 microamperes in operations on the anterior teeth and the bicuspids. For the molars, a maximum effect was observed at 4 and at 10 microamperes.

The following precautions should be taken: (1) the current should be decreased as the pulp chamber is approached; (2) the handpiece must be insulated with a rubber sleeve or other poor conducting material; (3) a conducting lubricant in the handpiece should be used (10 per cent potassium soap solution is suggested); (4) a good contact between tooth and bur must be maintained by the use of a harmless electrolyte such as a solution of salt, sodium bicarbonate, or procaine hydrochloride.

In the preparation of cavities in 204 teeth on 126 patients ranging in age from 7 to 67 years old, the method was effective in 91 per cent of the cases and ineffective in 9 per cent. In no case was an increase in pain reported.

The technic has been successfully applied for the painless lancing of abscesses, the removal of serumal calculus, hypodermic injections and other operations.

George C. Paffenbarger

Deaths

Agnew, James, Norwalk, Ohio; died August 19; aged 81.

Bauman, Arthur N., New Rochelle, N. Y.; New York College of Dentistry, 1904; died September 16; aged 71.

Bigham, Leon T., Watertown, N. Y.; School of Dentistry, University of Pennsylvania, 1902; died October 17; aged 74.

Bird, Joseph K., Clearfield, Pa.; School of Dentistry, University of Pittsburgh, 1927; died September 13; aged 53.

Birdsall, John M., Lawrence, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1906; died October 20; aged 74.

Boehnlein, Armin H., Detroit; College of Dental Surgery, University of Michigan, 1919; died October 26; aged 59.

Botkin, Edwin H., South Charleston, W. Va.; Dental School, Northwestern University, 1909; died August 31; aged 77.

Bowling, William W., Durham, N. C.; Atlanta-Southern Dental College, 1932; died October 23; aged 50.

Brasie, Ivan G., Morristown, N. Y.; Pennsylvania College of Dental Surgery, Philadelphia, 1903; died October 23; aged 73.

Brown, James A., St. Louis; School of Dentistry, Washington University, St. Louis, 1903; died October 5; aged 73.

Brown, James B., Berryville, Ark.; Louisville College of Dentistry of Centre College, 1913; died November 7; aged 75.

Brown, Robert W., Primos, Pa.; School of Dentistry, University of Pennsylvania, 1904; died October 11; aged 71.

Burkert, Herbert R., Fort Smith, Ark.; School of Dentistry, University of Kansas City, 1944; died October 30.

Burney, William, Atlanta, Ga.; Dental Department, Meharry Medical College, 1913; died September 22; aged 66.

Bursell, Harry L., Fairmont, Minn.; College of Dentistry, University of Minnesota; 1916; died October 17; aged 60.

Bruzelius, Axel N., Lima, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1901; died October 24; aged 82.

Carnes, Thomas P., Salmon, Idaho; died August 17; aged 73.

Cherry, Joseph B., Washington, D. C.; College of Dentistry, Howard University, 1910; died February 16, 1954; aged 71.

Christie, R. Wilson, Muskegon, Mich.; College of Dental Surgery, University of Michigan, 1922; died in October; aged 56.

Chumar, Frank E., Philadelphia; Philadelphia Dental College, 1903; died August 20.

Clarke, Clarence C., Socorro, N. Mex.; Louisville College of Dentistry of Centre College, 1904; died September 1; aged 74.

Claxton, Walter F., Somerville, Tenn.; Louisville College of Dentistry of Centre College, 1908; died September 19; aged 74.

Cohan, William M., Kankakee, Ill.; Dental School, Marquette University, 1925; died November 25.

Coons, George F., Ironwood, Mich.; Chicago College of Dental Surgery, Loyola University, 1913; died September 26; aged 68.

Courtney, A. George, Syracuse, N. Y.; Pennsylvania College of Dental Surgery, 1891; died October 9; aged 84.

Cramer, Myron F., Worthington, Minn.; Dental School, Northwestern University, 1918; died September 19; aged 59.

Crowell, Harold W., Lynn, Mass.; Dental School, Tufts College, 1916; died October 20; aged 59.

Davis, Charles W., Salem, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1923; died in October; aged 57.

Derad, Edward D., Philadelphia; School of Dentistry, University of Pennsylvania, 1932; died September 17; aged 47.

DeWolf, Charles A., Garnett, Kan.; Kansas City Dental College, 1915; died September 15; aged 66.

Dowell, James N., North Little Rock, Ark.; School of Dentistry, Vanderbilt University, 1908; died November 4; aged 74.

Downs, George E., Yerington, Nev., College of Dentistry, University of Southern California, 1924; died September 29; aged 54.

Dunbar, Francis W., Minneapolis; College of Dentistry, University of Minnesota, 1910; died September 3; aged 70.

Ecker, William H., Worcester, Mass.; Dental School, Harvard University, 1923; died November 2; aged 55.

Eliasberg, Louis, Brooklyn; New York College of Dentistry, 1907; died September 18; aged 71.

Elliot, Elmore W., Oak Park, Ill.; Chicago College of Dental Surgery, Loyola University, 1898; died November 28; aged 72.

Ellis, Henry A., Lemmon, S. Dak.; Dental Department, Milwaukee Medical College, 1901; died August 25; aged 83.

Emery, Charles B., Marion, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1904; died September 20; aged 76.

Essig, Jacob E., Louisville, Ky.; School of Dentistry, University of Louisville, 1924; died June 26; aged 53.

Evans, Paul K., Hershey, Pa.; School of Dentistry, University of Pittsburgh, 1928; died in July; aged 52.

Fiebig, William F., Portland, Ore.; Dental School, Northwestern University, 1905; died October 21; aged 84.

Fields, William H., Denver; College of Dentistry, University of Iowa, 1915; died September 7; aged 63.

Fortunati, Alexander J., Boston; died February 22, 1954.

Foster, Leslie W., Talihina, Okla.; College of Dentistry, University of Minnesota, 1921; died October 29; aged 63.

Gaskill, John T., Willard, Ohio; died September 25; aged 84.

Goetz, Otto A., Naperville, Ill.; Chicago College of Dental Surgery, Loyola University, 1902; died October 24; aged 80.

Golberg, Thomas P., Blooming Prairie, Minn.; Chicago College of Dental Surgery, Loyola University, 1909; died March 29, 1954; aged 70.

Gould, Albert W., Taylor, Texas; College of Dentistry, University of Tennessee, 1898; died September 25.

Grace, Russell L., Albany, Ga.; Southern Dental College, Atlanta, 1913; died June 25; aged 63.

Griffith, Charles B., Fulton, N. Y.; Faculty of Dentistry, McGill University, Montreal, 1938; died September 28; aged 41.

Gross, Morris E., Brooklyn; New York College of Dentistry, 1917; died November 5, aged 57.

Grossman, Reginald, Yonkers, N. Y.; School of Dental and Oral Surgery, Columbia University, 1924; died October 2; aged 53.

Halverson, Holton J., Fond du Lac, Wis.; Dental School, Marquette University, 1922; died October 24; aged 55.

Hamilton, Robert F. J.; Norfolk, Va.; School of Dentistry, Medical College of Virginia, 1914; died October 8; aged 76.

Harper, George E., Findlay, Ohio; Cincinnati College of Dental Surgery, 1899; died October 20; aged 84.

Hayman, Sylvester, Scarsdale, N. Y.; New York College of Dentistry, 1919; died July 25; aged 56.

Heath, Fred E., Cadillac, Mich.; died August 15; aged 69.

Henderson, Andrew H., Greenville, Miss.; School of Dentistry, Vanderbilt University, 1908; died July 1, aged 70.

Henneman, Henry F., Sauk Centre, Minn.; Dental Department, Milwaukee Medical College, 1904; died February 7, 1954.

Herbig, LeRoy, Utica, N. Y.; School of Dentistry, University of Buffalo, 1910; died October 25; aged 68.

Hogan, Robert G., Meadville, Pa.; School of Dentistry, University of Pittsburgh, 1935; died November 10; aged 43.

Hudson, Quillen O., Granby, Mo.; School of Dentistry, Washington University, St. Louis, 1898; died July 19; aged 82.

Hughes, William G., Walla Walla, Wash.; School of Dentistry, North Pacific College of Oregon, Portland, 1911; died August 4; aged 73.

Jarrendt, Ferdinand J., Chicago; Chicago College of Dental Surgery, Loyola University, 1921; died October 14; aged 56.

Keller, Marion H., Dallas, Texas; Atlanta-Southern Dental College, 1925; died September 26; aged 54.

Kelly, Worrall S., Chicago; Chicago College of Dental Surgery, Loyola University, 1917; died November 1.

Kirkendall, Halley, Birch Tree, Mo.; School of Dentistry, St. Louis University, 1907; died July 20; aged 72.

Kutner-Shiffman, Rose, New York; College of Dental and Oral Surgery, New York, 1917; died September 23; aged 60.

Kruzicki, Bernard D., Kenosha, Wis., Dental School, Marquette University, 1926; died June 1; aged 53.

Laessig, Hubert L., Marshall, Wis.; Dental School, Marquette University, 1928; died September 4; aged 47.

Landesman, Morris, Brookline, Mass.; Chicago College of Dental Surgery, Loyola University, 1915; died October 2; aged 66.

Langell, Dudley B., Cleveland; College of Dentistry, Western Reserve University, 1916; died October 8; aged 59.

Lansden, Joe P., Lawton, Okla.; Kansas City-Western Dental College, 1935; died July 28; aged 45.

Lemley, Dwight I., Rochester, N. Y.; College of Dentistry, University of Iowa, 1927; died October 24; aged 52.

Lind, Thomas W., Emporia, Kan.; Western Dental College, Kansas City, 1904; died September 25; aged 72.

Little, George B., Palo Alto, Calif.; College of Dental Surgery, University of Michigan, 1893; died September 30; aged 85.

Locke, Maurice E., Brockton, Mass.; Dental School, Tufts College, 1902; died October 31.

Loos, Adam W., Elkhart Lake, Wis.; Dental School, Marquette University, 1903; died July 28; aged 74.

MacConkey, William R., Rochester, N. Y.; College of Dentistry, Ohio State University, 1937; died October 25; aged 43.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco
Ninety-Seventh Annual Session	Oct. 1-4, 1956	Atlantic City, N.J.
Ninety-Eighth Annual Session		Miami, Fla.
Ninety-Ninth Annual Session		Dallas, Texas
One-Hundredth Annual Session		New York

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 4, 5	Birmingham	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska			R. M. MacKenzie	Alaska Native Service, Juneau
Arizona	Apr. 27-30	Grand Canyon	R. W. Christensen	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 3-6	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 16	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	May 9-11	Los Angeles	J. P. Bowers	124 W. Lime Ave., Monrovia
Colorado	Oct. 2-5	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 18-20	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			R. J. Zurkow	152 S. State St., Dover
District of Columbia	June 14	Washington	Z. B. Lloyd	2007 R St., N.W., Washington
Florida	Apr. 24-27	Jacksonville	J. E. Edwards	152 Alhambra Circle, Coral Gables
Georgia	Oct. 2-5	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	June 13-18	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	May 19-21	Coeur d'Alene	F. O'Halloran	Box 703, Coeur d'Alene
Illinois	May 9-12	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria
Indiana	May 16-18	Indianapolis	D. C. Barnhill	400 Bankers Trust Bldg., Indianapolis
Iowa	May 1-4	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 15-18	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 18-21	Louisville	A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana	Apr. 13-16	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 23-25	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 2-4	Baltimore	E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore
Massachusetts	May 1-4	Boston	H. E. Tingley	12 Bay State Rd., Boston
Michigan	Apr. 18-20	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Mar. 28-30	Minneapolis	C. V. E. Cassel	225 Hamm Bldg., St. Paul
Mississippi	Apr. 24-27	Jackson	B. A. Cohen	306 Plaza Bldg., Jackson
Missouri	May 15-18	Kansas City	E. D. Sugget	201 Merchants Bank Bldg., Jefferson City
Montana	May 5-7	Bozeman	E. G. Vedova	Roundup
Nebraska	May 9-12	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	June 10-12	Lake Tahoe	O. M. Seifert	506 Humboldt St., Reno
New Hampshire	June 12-14	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	Apr. 18-20	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 22-25	Ruidoso	J. S. Ellar	Medical Arts Square, Albuquerque
New York	May 16-18	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 15-18	Pinehurst	R. D. Coffey	Kibler Bldg., Morganton
North Dakota	May 1-4	Grand Forks	V. B. Keltgen	517 de Lendrecie Bldg., Fargo
Ohio	Nov. 13-16	Cleveland	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20	Tulsa	S. A. Russman	809 Medical Arts Bldg., Oklahoma City
Oregon	Mar. 7-9	Portland	T. D. Holder	308 Selling Bldg., Portland
Panama Canal Zone			A. L. Teitel	Box D, U.S. Naval Station, Rodman
Pennsylvania	May 16-18	Philadelphia	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico				Box 624, San Juan
Rhode Island			B. C. Friedman	2 Ayrault St., Newport
South Carolina	May 22-24	Charleston	J. R. Owings	7 Medical Court, Greenville

State	Date	Place	Secretary	Address
South Dakota	May 15-17	Aberdeen	L. N. Thelen	310A W. 18th St., Sioux Falls
Tennessee	May 8-12	Nashville	A. M. Ballentine	Pulaski
Texas	May 1-5	San Antonio	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 21-23	Ogden	R. C. Dalgleish	124 State Capitol Bldg., Salt Lake City
Vermont	May 30-June 1	Manchester	W. J. Reardon	18 Madison St., Rutland
Virginia	Apr. 29-May 6	Havana, Cuba	W. T. McAfee	705 Colonial National Bank Bldg., Roanoke
Washington	Mar. 24-26	Seattle	W. B. Martin	Medical-Dental Bldg., Seattle
West Virginia	July 24-27	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 25-27	Milwaukee	A. E. Kopp	Wells Bldg., Milwaukee
Wyoming	June 16-18	Cheyenne	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 20-24* June 20, 21†	Birmingham	W. L. McCarty	200 Professional Center, Montgomery
Alaska			R. H. Williams	Box 2122, Juneau
Arizona			R. K. Trueblood	107 East A Ave., Glendale
Arkansas	June 20-24*†	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California	Feb. 7	San Francisco	T. E. Tiden	Medico-Dental Bldg., Sacramento
	June 20	Los Angeles		
	July 25	San Francisco		
Colorado			J. M. Peabody	724 Republic Bldg., Denver
Connecticut		New York	C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	Suite 718, 1835 Eye St., N.W., Washington
Florida	July 11-21*†	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia			P. M. McNeil	307 First National Bank Bldg., Rome
Hawaii	Feb. 17-20	Honolulu	H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			R. E. Blickenstaff	1023 Fourth St., S., Nampa
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana	June 14-17*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	May 23-27‡		D. J. FitzGerald	615 Brick & Title Bldg., Mason City
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky	June 6-9	Louisville	R. M. Justice	1330 Central Ave., Ashland
Louisiana	June 5-10	New Orleans	R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	June 6-8‡		H. Levin	3429 Park Heights Ave., Baltimore
Massachusetts	June 13-16*† June 15, 16†‡		G. J. Fink	Rm. 33, State House, Boston
Michigan	June 5-11	Ann Arbor	J. L. Champagne	3714 W. McNichols Rd., Detroit
Minnesota	June 13-17*†‡		M. G. Walls	615 Montcalm Place, St. Paul
Mississippi	June 21-23	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri	June 13-18	St. Louis Kansas City	R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana			V. J. Quinn	301 Phoenix Bldg., Butte
Nebraska	June 13	Lincoln	H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			R. Whitehead	Suite 6, Masonic Temple Reno
New Hampshire			S. G. Markos	8 Renaud Ave., Dover
New Jersey	May 25, 26*	Washington, D.C.	W. A. Wilson	150 E. State St., Trenton
	June 1, 2*	Philadelphia		
	June 8, 9*†	New York		
	June 13, 14*	Trenton		
New Mexico			J. J. Clarke, Sr.	Artesia
New York	Feb. 10-11*‡		D. W. Beier	23 S. Pearl St., Albany
	Feb. 15-18*‡			
	Feb. 10†‡			
	Feb. 15, 16†‡			
North Carolina	June 27-July 1	Chapel Hill	F. O. Alford	1107 Liberty Life Bldg., Charlotte
North Dakota	June 20-24	Fargo	A. L. Pushor	Lisbon
Ohio			H. B. Smith	322 E. State St., Columbus

State	Date	Place	Secretary	Address
Oklahoma			R. P. Keidel	403 Surety Bldg., Muskogee
Oregon	June 6-9*†	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania	June 20-25	Philadelphia	A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
	June 20-22	Pittsburgh		
Puerto Rico			J. Mercado C.	Box 3717, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			H. T. Aker	Canton
Tennessee			C. R. Alta	619 Bennie Dillon Bldg., Nashville
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			D. L. Folsom	1101 First Security Bank Bldg., Salt Lake City
Vermont	June 27-29	Burlington	P. M. Fitch	Newport
Virginia	June 6-11*	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond
	June 6, 7†			
Washington			M. L. Mower	National Bank of Commerce Bldg., Olympia
West Virginia	June 20-22*†	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	June 13-17*†	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.

*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. §Approximate dates—verify with state dental examining board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	May 8	New York	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine	May 13-15	New York	W. M. Greenhut Secy.	124 E. 84th St., New York
American Academy of Implant Dentures	Feb. 4, 5	Chicago	P. S. Loechler Secy.	1924 Thomas Lane, Augusta, Ga.
American Academy of Maxillofacial Prosthetics	Feb. 5, 6	Chicago	R. E. Stewart Pres.	833 Elm St., Winnetka, Ill.
American Academy of Restorative Dentistry	Feb. 5, 6	Chicago	A. G. James Secy.	409 N. Camden Drive, Beverly Hills, Calif.
American Association of Dental Schools	Mar. 20-23	Chicago	M. W. McCrea Secy.	Baltimore College of Dental Surgery, University of Maryland, Baltimore
American Association of Endodontists	Feb. 5, 6	Chicago	V. B. Milas Secy.	2559 W. 63rd St., Chicago
American Association of Industrial Dentists	Apr. 26-28	Buffalo	E. R. Aston Secy.	South Office Bldg., Harrisburg, Pa.
American Dental Society of Europe	July 11-14	Amsterdam, Netherlands	J. Moloney Hon. Secy.	110 Harley St., London, England
American Denture Society	Feb. 4, 5	Chicago	A. L. Roberts Secy.	4 Main St., Aurora, Ill.
British Dental Association	July 4-8	Glasgow, Scotland	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London, England
Chicago Dental Society	Feb. 6-9	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Cincinnati Dental Society Clinic	Mar. 27-29	Cincinnati	W. C. Jolly Secy.	403 Tracton Bldg., Cincinnati
Council on Dental Education, Dental Aptitude Tests	Apr. 29, 30		S. Peterson Secy.	222 E. Superior St., Chicago
District of Columbia Postgraduate Clinic	Mar. 13-16	Washington, D.C.	E. M. Colvin, Jr. Gen. Chm.	1726 21st St., N.W., Washington, D.C.
Federation Dentaire Internationale	Aug. 14-20	Copenhagen, Denmark	G. H. Leatherman Secy. Gen.	35 Devonshire Place, London, England
First Congress of Oral Surgery of Cuba	Apr. 25, 26	Havana, Cuba	P. Garcia Secy.	Edificio Retiro Odontologico, Calle L No. 353, Vedado, Havana, Cuba

Name	Date	Place	Secy. or Chm.	Address
Greater Philadelphia Annual Meeting	Feb. 2-5	Philadelphia	R. Adams Secy.	337 Bellevue-Stratford Hotel, Broad and Walnut Sts., Philadelphia
International Association for Dental Research	Mar. 18-20	Chicago	E. H. Hatton Secy.	2419 Simpson St., Evanston, Ill.
National Board of Dental Examiners	Mar. 28, 29		G. J. Casey Secy.	222 E. Superior St., Chicago
Northeastern Society of Orthodontists	Mar. 7, 8	New York	W. J. Prezzano Secy.	Medical Center, White Plains, N.Y.
Paraguay National Dental Week	Mar. 9-12	Asuncion, Paraguay	C. G. Torreani Secy.	Casilla de Correo 565, Asuncion, Paraguay
Seminario Anual del Grupo de Estudios Dentales U. S. C. de Mexico	May 15-19	Tehuacan, Puebla, Mex.	R. S. deLascurain Secy.	Insurgentes 257-10, Mexico, D.F.
Sixth Annual Berkshire Conference	June 19-23	Lenox, Mass.	I. Glickman Dir.	Tufts College Dental School, 136 Harrison Ave., Boston
Southern Academy of Oral Surgery	Mar. 19, 20	Chattanooga Tenn.	R. F. Sullivan Secy.	118 Jones St., E., Savannah, Ga.

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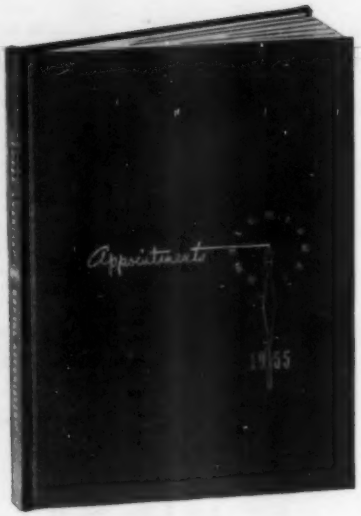

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Gurdjian, E. S., and Webster, J. E., Amer. J. of Surgery, 63:236, 1944.

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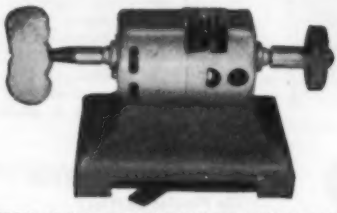

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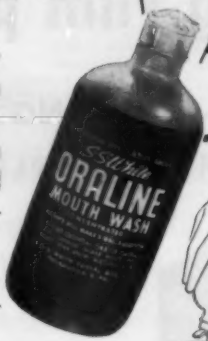

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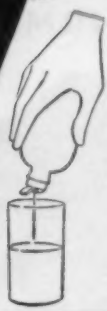

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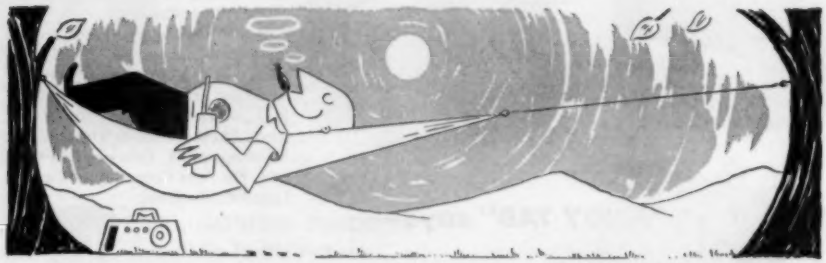

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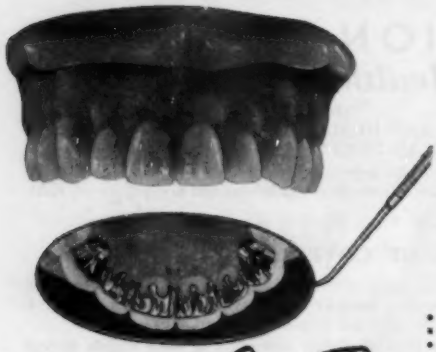

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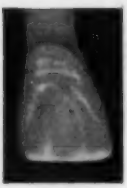

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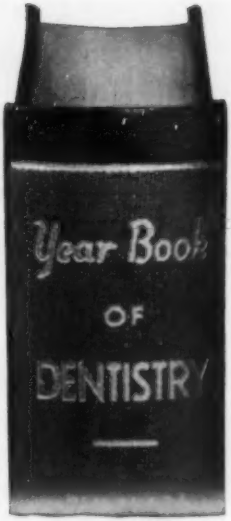

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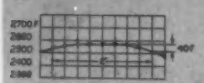

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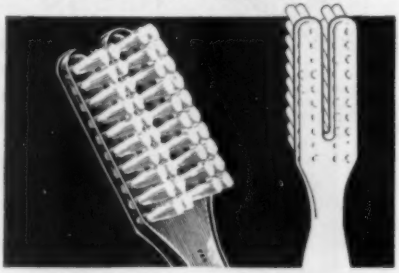

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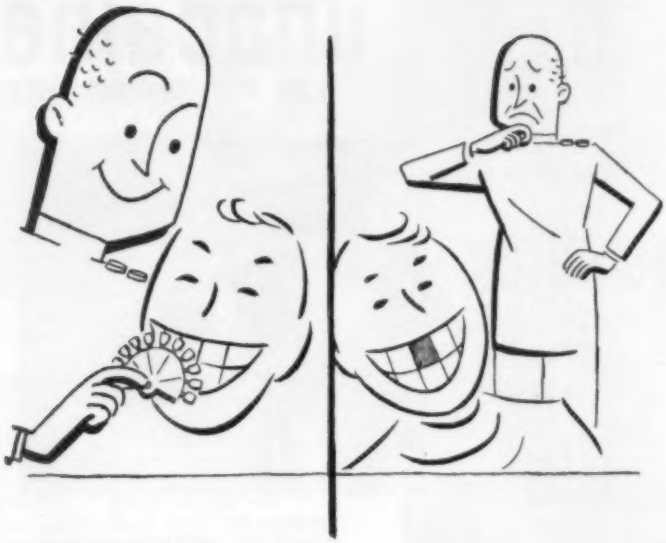

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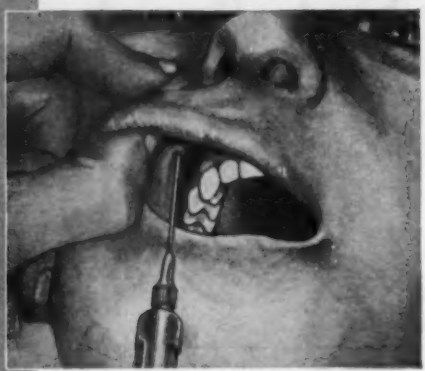

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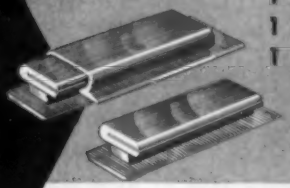

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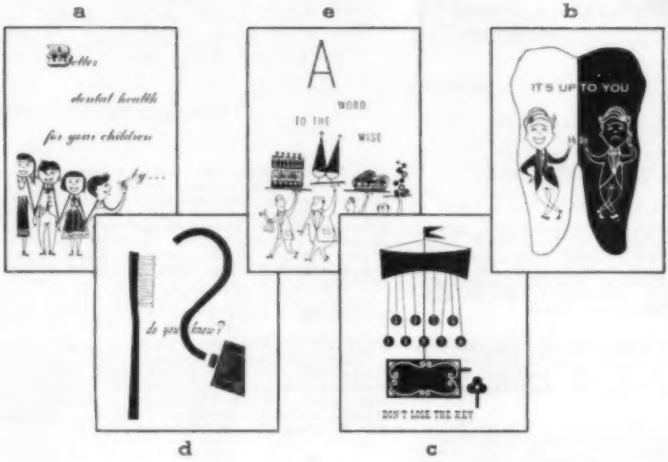

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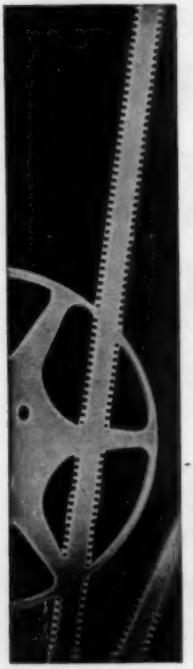

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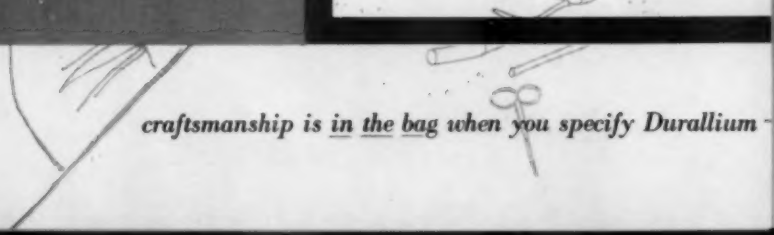
How shall a clasp be built? With what taper . . . what length . . . what flexibility? How does the depth of undercut affect the shape of the clasp? These questions and more (how thick should a cast palate be? . . . what is the proper cross-section for a lingual bar? . . .) can best be answered in the research laboratory. And as a Durallium laboratory we are indebted to Durallium researchers for their tireless effort in finding the facts, evolving the theories, testing them — and then giving our technicians the means of applying them.

SKILL

Durallium bulletins and clinics . . . new materials, tools and techniques . . . all of these add up to make our experienced technicians constantly more skillful. Whether you want an Iso-Clasp case with buccal-arms hidden, a beautifully-carved bite-raiser, or a full palate with tissue detail reproduced on both the tongue and tissue sides—whatever your case requires — you can depend on our qualified Durallium technicians to do it right!



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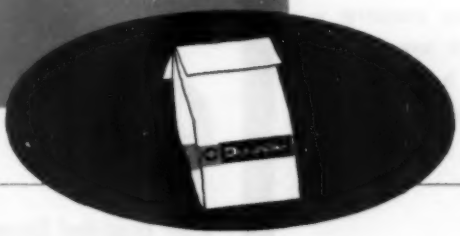
Just as quality control is exerted throughout the manufacture of Durallium and its processing materials, Durallium laboratories are equipped to control the quality of craftsmanship. "Hit or miss" techniques have been eliminated from every vital phase of design and construction. From the measurement of an undercut, to the mixing of investment, scientific precision is the rule. That's why you can always depend on the result when you specify Durallium.



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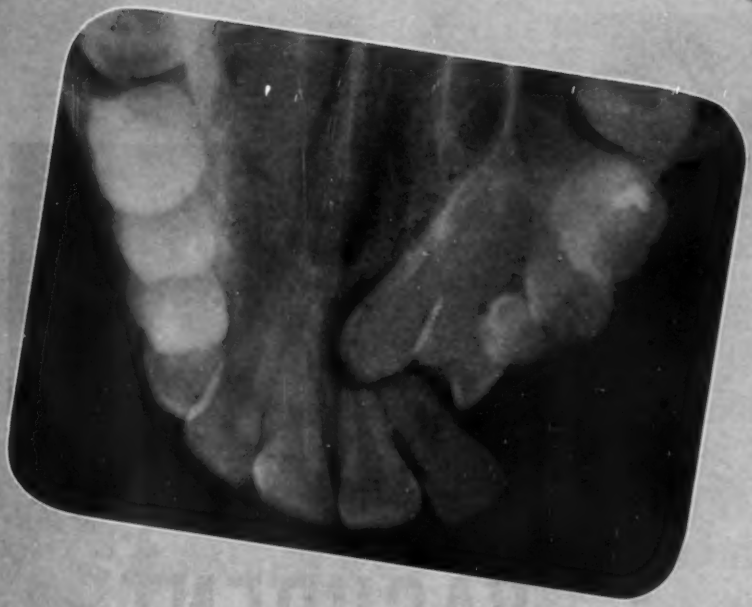

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Use Kodak Dental X-ray Film . . .

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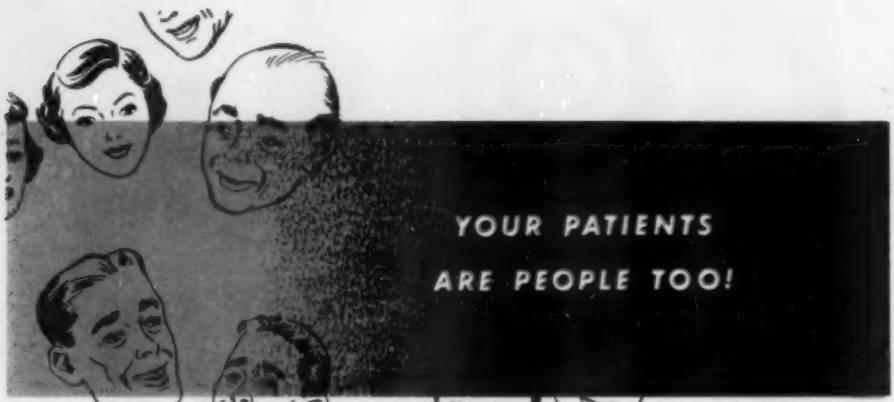

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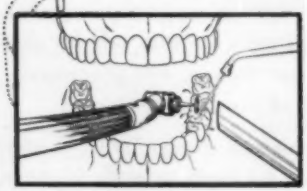

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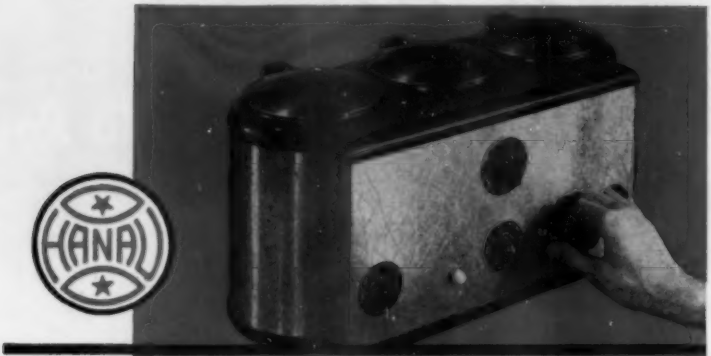

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Three compartments for timer-controlled liquefying, thermostatically controlled storing and tempering.

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A completely self-contained unit, the Hanau Electric Hydrocolloid Conditioner performs each conditioning stage under accurate, automatic control.

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—the silicate that safely ignores storm warnings!

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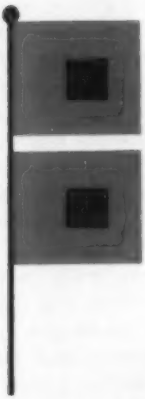

We're not suggesting that a dentist would start a silicate filling while a hurricane is veering toward his office door.

But with Syntrex, you *could* place the filling—because there never was a silicate less sensitive to atmospheric conditions!

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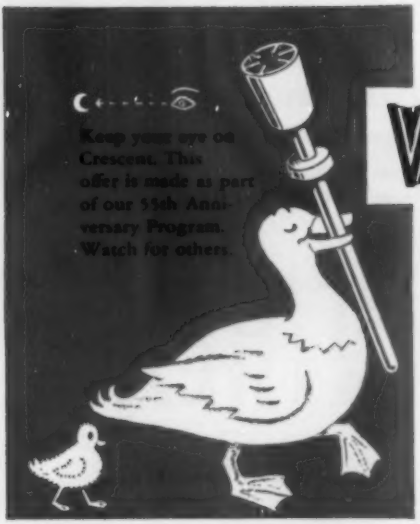
In any weather, in any month, you can depend on Syntrex . . . *"the best-behaved silicate in dentistry."*

For modern materials call on **Caulk** *Milford, Delaware*



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Try a Crescent Webbed White Rubber Cup on your very next patient. Note how well the webs hold the abrasive, and how much faster they clean *without spraying the patient.* Observe the powerful—yet smooth and gentle action. Crescent rubber cups are permanently mounted on mandrels. Think of the fuss and bother this saves you while patients wait; no misplaced mandrels, no buttoning on or off hard-to-handle cups.

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- ✓ are smooth, gentle; easy on the patient
- ✓ fit your handpiece and run true
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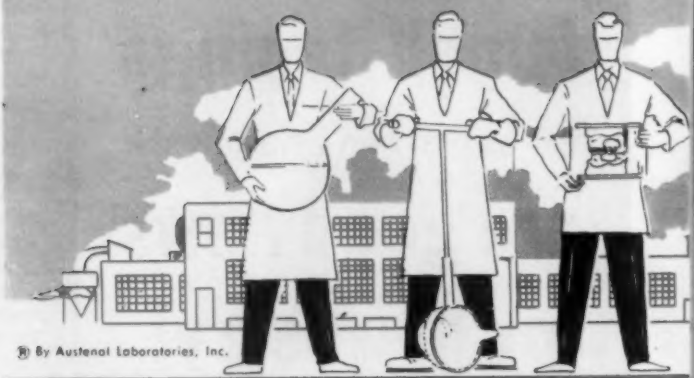

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A new contra angle especially designed for high speeds, and offering several definite advantages over existing instruments. For example:

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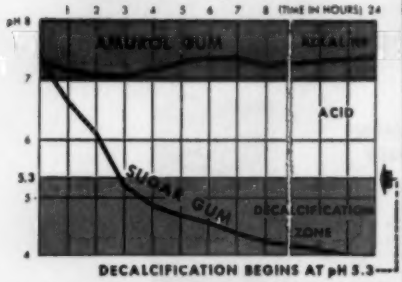
Comparative Effects of Sugar Gum and Amurol Gum on pH of Saliva



DECALCIFICATION BEGINS AT pH 5.3

As shown above, pH of caries-active saliva remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.

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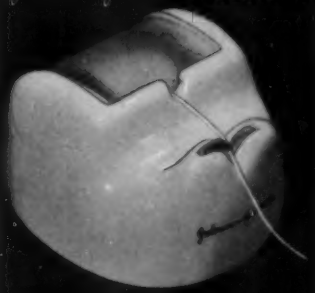

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. . . . . Write for comprehensive article on Coe-Flex by W. S. Rice, D. D. S., reprinted from Cal Magazine, May 1954.

Coe Laboratories, Inc., Chicago 21, Ill.

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Coe-Flex impression made on Coe Perforated Tray with modeling compound peripheral beading and stops.

Coe-Flex impression made with standard tray after preliminary impression in modeling compound.

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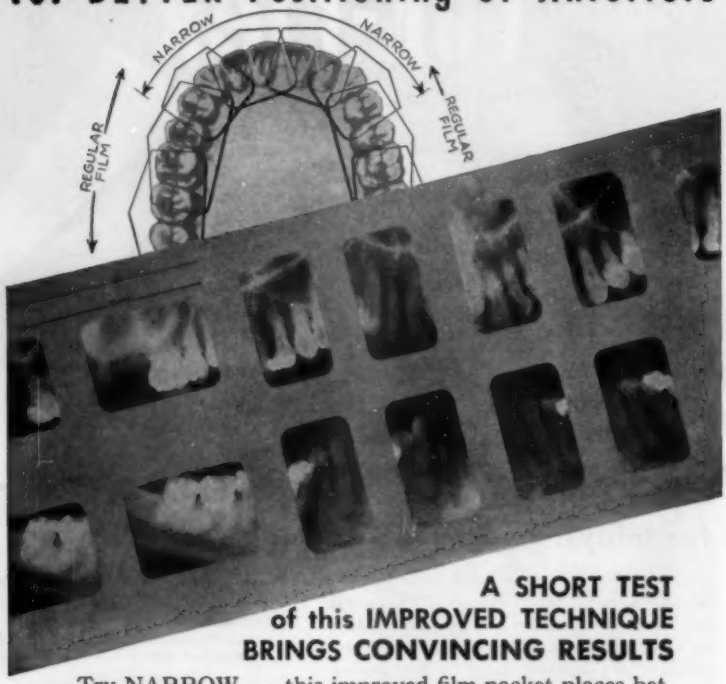
for BETTER Positioning of Anteriors



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Try NARROW . . . this improved film packet places better. NARROW means finer radiographic results . . . it shows ALL the conditions. NARROW technique calls for 8 instead of 6 when doing full anteriors. . . . Use regular size packets for posteriors. NARROW is another fine RINN development to bring you better radiographs.

Two undistorted teeth on one film.

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Made in two speeds, Intermediate and Extra Fast.

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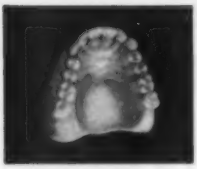

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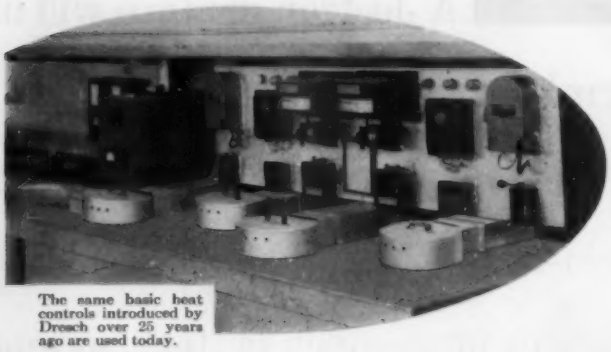
First to Control the Heat . . . to Control the Fit!



The same basic heat controls introduced by Dresch over 25 years ago are used today.

The idea that definite temperature controls were necessary to make good fitting castings had its beginning with Dresch Laboratories when they set up the first pyrometer controlled electric furnace over 25 years ago. Today this is just a part of the precision technic employed by Dresch to construct their Replicast removables in Gold and Ticonium.

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Fractured teeth are common and serious occurences. Rough games, drinking fountain accidents, and minor auto collisions are just a few of the causes. When such an emergency happens the dentist must treat the tooth rapidly and effectively to save the tooth.

Rocky Mountain's new permanent Anterior Crowns provide a more positive method of caring for such emergencies. They are readily adapted and the dentist can rely on their standing up indefinitely. As a matter of fact, the patient can chew on them only a few hours after treatment and they will withstand rough abuse thereafter.

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OPEN FACE CROWNS: Later if the patient wants a more aesthetic result, it is a simple matter to make an open face crown by removing the labial.

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If you wish a small Emergency Kit assortment of these crowns (only $5.40), contact your dealer. If you wish additional information, just mail the completed coupon. We will be happy to send you a technical brochure.

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7

Reasons why YOU will like TICONIUM

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TICONIUM CASES FIT — Plaster-bound investment, hydrocolloid impression material and a rigidly controlled technique produce fine-grain, accurate cases.

SOLDERABILITY — Work is handled easier; cases can be re-finished better; warpage of original casting is minimized.

STRONGER CLASPS — Ticonium clasps have better adjustment and longer life.

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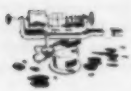

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PRESCRIBED FOR SURGERY — Ticonium #25 has been tested and used successfully in surgery for many years.

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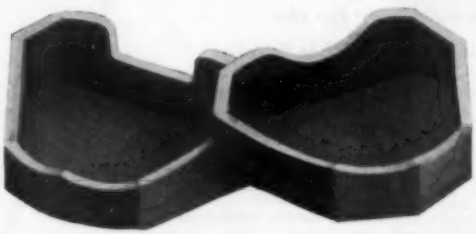

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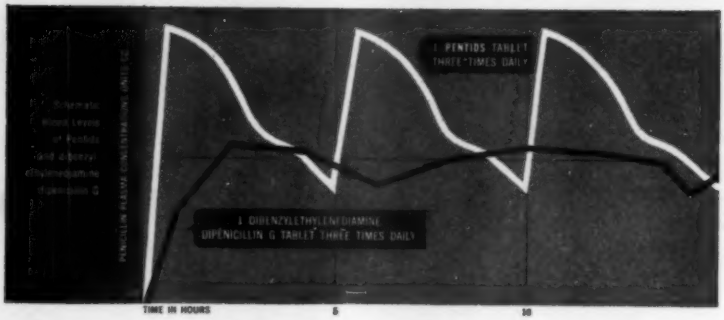

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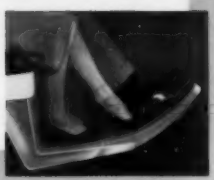

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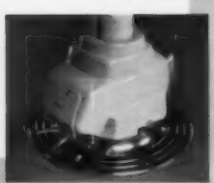

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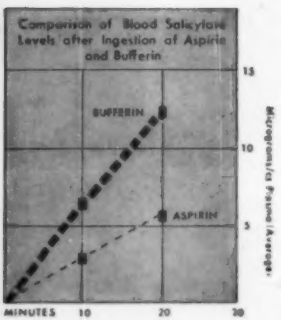

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